

**ENVIRONMENTAL,  
DISEASE  
AND  
ECO-THEOLOGY**

02800



## **COMMUNITY HEALTH CELL**

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ENVIRONMENTAL  
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02800

1994-2013

By

Bro: Thomas Chennad.  
C.M.S.BI



THEESIS SUBMITTED TO JYOTHSADAN SCHOLASTICATE AS A  
PARTIAL FULFILMENT FOR THE "DIPLOMA IN THEOLOGY".

M O D E R A T O R

Dr. SHIRDI PRASAD TEKUR.

COMMUNITY HEALTH CELL

BANGALORE

1994



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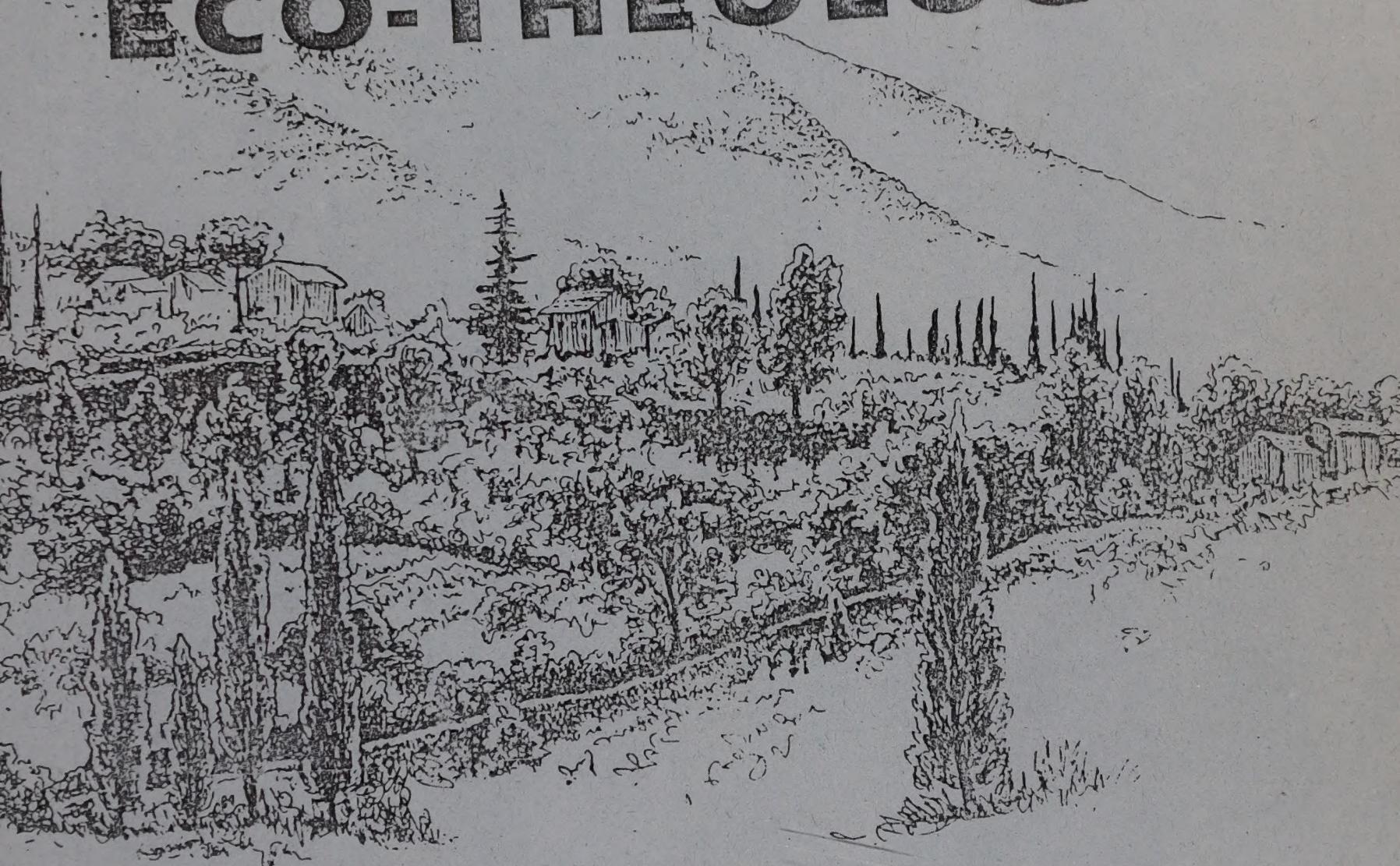
COMMUNITY HEALTH CELL

BANGALORE

1994

# ENVIRONMENTAL, DISEASE AND ECO-THEOLOGY

Mount Subasio





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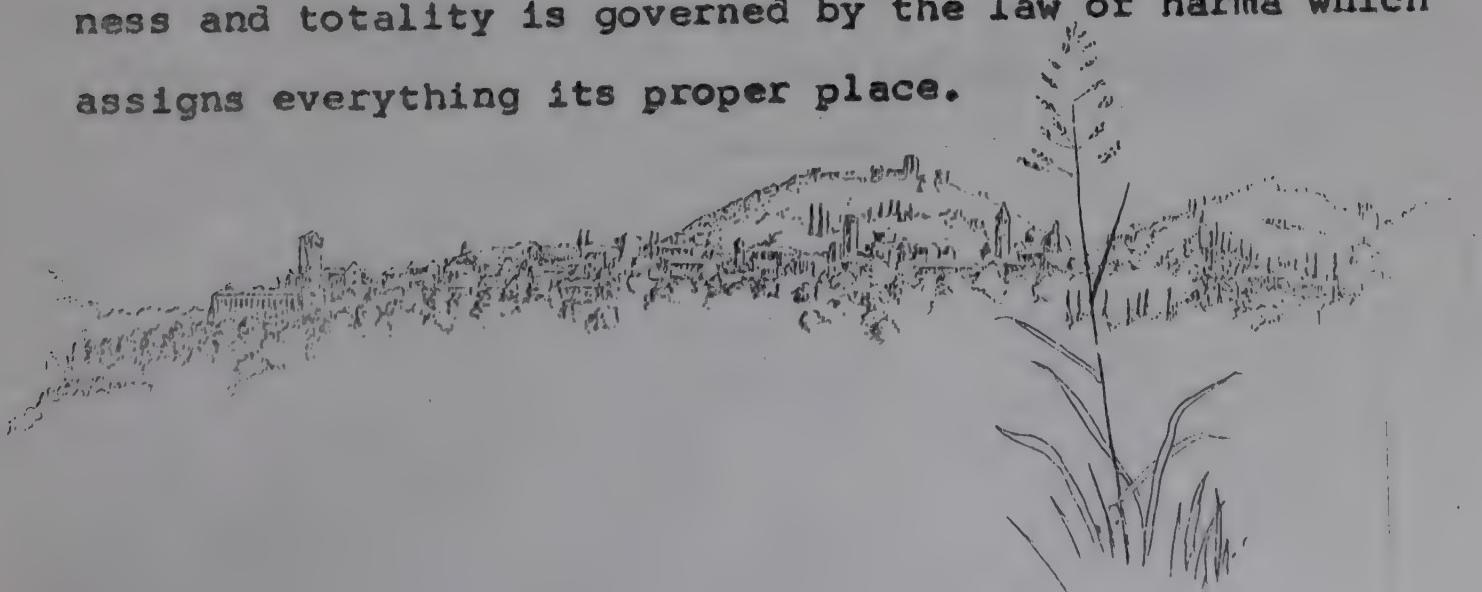


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examine the role forest play in the protection of the environment. The second chapter imparts available scientific information on health hazards caused by various environmental problems like green house effect, ozone depletion, deforestation, land air, water pollution, radiation and the like. It makes amply clear how extensively our health and well-being can be injured by a polluted environment. The third chapter is the explanation of the biblical eco-theology of iter relationship. The ecological crisis has its roots in man, in his vision of himself, of the whole creation and their inter-relationship, in his value system and priorities, all of which relate to the religio-moral dimensions of the crisis. The Indian tradition puts much emphasis on the immanence of the Divine mystery in nature and in relations of God with humans and nature. Also Indian cultural holistic tradition with its emphasis on harmony in nature and the need for human to live in harmony with nature rather than exercise dominion over it, could be integrated into such a theology. Human and nature in Indian tradition seen in terms of wholeness and totality is governed by the law of harma which assigns everything its proper place.





## A C K N O W L E D G E M E N T S

\* \* \* \* \*

It is with deep indebtedness that I express my profound gratitude to Dr.SHIRDI PRASAD TEKUR, Co-ordinator, Community Health Cell, Bangalore, Who is the moderator of this thesis. He has, with his deep knowledge and inspiring suggestions, given me every assistance. Since he is an expert in Environment and Disease, his genuine guidance, timely suggestions and searching criticisms have been of immense value for the realization of this thesis. I avail myself of this opportunity to express my deep sentiments of gratitude to Fr.Joseph Chittor fro his guidance in Eco-theology, generosity and help. A word of speical thanks is also offered to Rev.Bro.Rector, Paschal Mattathil and Rev.Bro.Thaddeus Kunnumpurath. I also express my profound thanks to the typist, Rev.Bro.Josephine.L.Lopez. Finally there are yet others who, in various ways, have helped me for the realization of this work. I thank them all most sincerely.

BRO. THOMAS THENNAD, C.M.S.F.



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Koranandalu,  
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Greetings from Community Health Cell !

Thank you for the privilege of being a member to guide  
Mr. S. M. Bhattacharya in his thesis work on "ENVIRONMENT, DISEASE  
AND HUMAN".

I wrote this thesis during its making and am  
sure you that Br. Thomas Thennad has painstakingly  
done with an eye towards accuracy and contemporary  
events. He has been able to direct his attention to the  
matter with great concern and enthusiasm.

I am impressed with his vision and commitment. I wish him all the best in his future endeavours.

WITH REGARD AND BEST WISHES,

Yours sincerely,

#### REFERENCES

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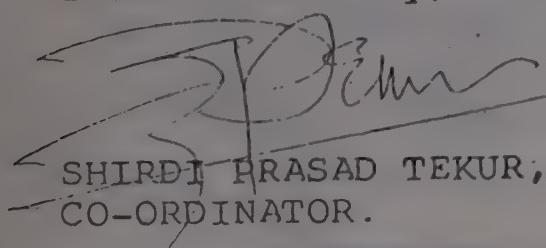
Thank you for the privilege of being a member to guide  
Br.Thomas Thennad in his thesis work on "ENVIRONMENT, DISEASE  
and ECO-THEOLOGY".

I have gone through this thesis during its making and am  
glad to inform you that Br. Thomas Thennad has painstakingly  
compiled the same with an eye towards accuracy and contemporary  
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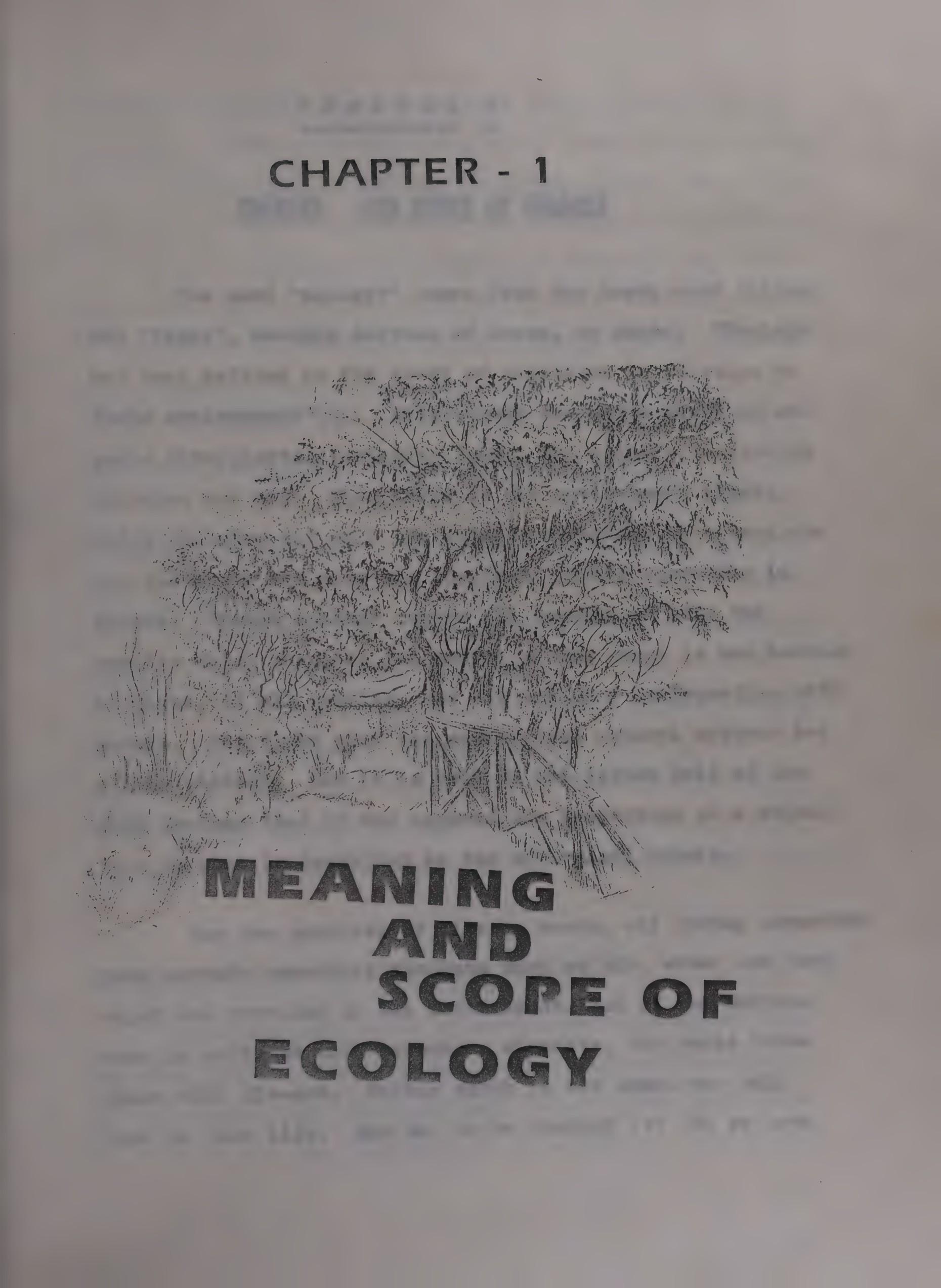
Yours Sincerely,

  
SHIRDI PRASAD TEKUR,  
CO-ORDINATOR.

\*spt/xa



# **CHAPTER - 1**



## **MEANING AND SCOPE OF ECOLOGY**



## CHAPTER I

---

### MEANING AND SCOPE OF ECOLOGY

The word "ecology" comes from the Greek word 'qitos' and 'logos', meaning doctrine of house, or abode. "Ecology has been defined as the study of organisms in relation to their environment"(1). This covers the whole world of organic life; plants, including fungi; and animals, including microbes and man. Then there is the environment itself, which includes not only the animate organisms that populate the biosphere but also the inanimate forces operating in nature. Though ecology covers all species of life the species which occupies the centre of the stage is man, because he alone, of all species, has set out on a confrontation with nature. His fight with the established natural systems has a long history. But it is only in the latter half of the 20th Century that it has assumed the proportion of a crisis. This is what is described as the ecological crisis.

For the survival of life on earth, all living creatures need certain essential elements such as air, water and food which are provided by the environment. But if the environment is polluted with poisonous elements, the whole biosphere will die-out. Mother earth is our home- our only home in this life. And so, do we destroy it? Do we have



any other recourse? When we destroy nature, we destroy ourselves because we devastate with its beauty and resources, our own inheritance as children of mother earth. Due to the industrial revelation modern man has developed a utilitarian view of nature and his environment. In order to have more production and for selfish gain, he is ready to exploit nature to the extent of destroying it. If mankind has to survive, we must control our harmful activities. We have to learn to live in harmony with nature instead of becoming its exploitors. The global ecological crisis we have today is more than just an environmental one. It is really the culmination of the many unresolved crises of our world - a world fragmented and divided, discontented and disoriented, hardly ever at peace with itself. The spread of industrialisation, urbanisation, overpopulation and exploitation of the Earth constitute the present ecological crisis. Today, man has become arrogant, selfish and careless with his modern life style. The burden of harm imposed on nature is beyond its capacity to bear. Trees are recklessly cut-down and thus deforestation has assumed alarming proportions.

#### Article 1 Forests and Ecological Protection.

Internationalisation of environmental problems been very rapid during the last few years. The need to protect the environment and the major role forests play in it were voiced from the very beginning of this century. The Siesra



club of California U.S.A, founded by John Muir, a popular writer and naturalist, as early as 1901 came up with a call from wilderness (for keeping natural vegetation free from any interference) and won popular support in due course against construction of Dams and submerging of forests.

In India importance of trees and forests was recognised as far back as Asoka's time. Many a literary work extolled forest and forest atmosphere. Puranic stories and legends have always been related to, or connected with forest. Rishis chose their abode in forest and several temples were built in forest areas. Forest was of religious importance too and was considered 'sanctum Sanctorum'. But the importance of forest was lost sight of in course of time and hence the present crisis.

The people in the bountiful valley of the Narmada are getting ready to face an immediate crisis. The tribal people, still rooted in their integrated, non-monetised, nonconsumerist communities right in the lap of the gigantic multipurpose Sardar Sarovar project, and supported by hundreds and thousands of peasants in Nimad in Madhya Pradesh, are all together and set face the coming submergence, which they hope will throw a challenge at the development sector's of today. The waters of the almighty Narmada Mata that have unreturned their life and culture through the ages,



are soon to be converted into mighty floods at the hands of the project authorities, representatives of the present "Civilisation in a hurry"(to exploit, harness and destroy?) Sardar sarovar, the project that has been pushed ahead with full claims, is yet to be 'finally, unconditionally cleared' by the sanctioning bodies- the ministry of environment and forests and the planning commission- and has been as not following its agriment with end , it is atleast a decade away from the day when it might prove its worth for the thirsty regions of Saurashtra and Kutch"(2).

While all this has yet to be done, the project has certainly proved the carelessness and insensitivity of the protector state towards its natural and national resources as well as the tribals. Even the partially raised concrete structure of Serdar Sarouar has blocked the river flow to such an extent that a back water effect is expected, and along with the 5000 - year old temple of Shurpaneshuar, a couple of hundred houses and farms, forest could face temporary, destructive submergence. The Govt. of India, is even now negotiating the destruction of an additional 2,50,000 hectares of forest land (over and above the 40,000 hectares being drowned) to facilitate the forced migration of over 2,50,000 people to be displaced by the Narmada project. For this purpose, against the letter and spirit



of the Forest Conservation Act (1980), the first forests have already succumbed. In Taloda, Maharashtra, tribals watched in disbelief and dismay as 400 hectares of their prime forest land was hacked down on 1june 5.1991 - world Enviornment dayl (3)

Our piorities have been defferent. We have been and are still bent on developing industries. "Judustrialize or perish", so said Nehru the builder of modern India. In the march towards progress through industress, we have to learn our lesson from developed nations and see to, it that precautions are taken against possible enviornmental damages. The technology for conservation and regeneration being not yet fully developed we have to be even aggressive and play a significant part in the process of rebuilding the enviornment.

#### A. ROLE OF FORESTS

Forests play a vital role in maintaining the climate, soil and water supply over a region. "Since times immemo- rial man has been utilising the natural riches of the forest, thinking this to be its main purpose. It was not until the beginning of the 20th century that it became clear, thanks to the major natural-science discoveries, that

the next month. I am now 40 years older than last year. I have  
had no physical changes and nothing has been lost but my  
hair. The remaining hair has not yet fully recovered. I am  
about 75% recovered and still on my way.

forests on our planet are not only a source of firewood, building materials and food. It was irreputably proved that they have unique capacity of neutralising man's negative impact on the environment, thus supporting the peculiar ecological balance. Forests play an important role in shaping the chemical and bacteriological composition of fresh water bodies, rivers, thermal regime, atmospheric gas balance, in maintaining soil fertility and protecting croplands. The dustcatching, anti-microbial and anti-radiation properties of forests have no analogues in nature. In spite of knowing all this, man intrudes into the life of the forest wealth caring for the effects" (4)

Forest and Environment act reciprocally. The ecology of a particular site or region or habitat is influenced by the type of vegetation it carries which in turn controls the environmental conditions. Thus vegetation has a major role in designing the environment. Realising this nature's truth, a wide campaign to grow more trees is now going on in all the world. The United Nation's Environmental programme (UNEP) has initiated studies to determine the role of forests in maintaining the environment. The U.N. has already made appeals to all nations to arrest felling of trees and launched tree planting programmes with a view to make the earth greener. According to the studies conducted by UNEP, the proportion of carbon dioxide is increasing rapidly in

the first time I have seen a  
real live *lizard*.  
I am sending you a  
small sketch of it.  
It is a small lizard  
about 3 inches long.  
It has a very long tail  
which is about twice  
as long as its body.  
The body is very flat  
and the tail is very  
thin and pointed.  
The lizard is brown  
in color and has  
a dark stripe running  
down the middle of its back.  
The tail is also  
brown and has  
a dark stripe running  
down the middle of it.  
The lizard is very  
active and seems  
to be very intelligent.  
It is a very interesting  
creature and I hope  
you will like it.

in the atmosphere becoming warmer. If this phenomenon continues unchecked, within a period of fifty years, a condition will set in when life itself will be difficult on this planet(5). It is an alarming piece of information and, thanks to the V.N, the nations all over the world have started responding to the appeal and greening programmes are in progress.

#### B. TURNING TO NATURE FOR BETTERING ENVIRONMENTAL CONDITIONS

As stated earlier, the plant growth(vegetation) has close relations with environment. Plants during photosynthesis, take in carbondioxide and give out oxygen. It is estimated that one hectare of forest produces oxygen equal to the quantity required for about 250 people. "The most recent factor affecting the oxygen cycle of the biosphere and the oxygen budget of the Earth is man himself. He inhales oxygen and exhales carbondioxide, thus reducing the stock of oxygen and increasing the supply of carbondioxide. He goes further and burns fossil fuels, depleting the oxygen supply still further. He reduces photosynthetic activity, by cutting down forests and replacing them with cities. Some astronomers think that the original supply of oxygen in the atmosphere came from the ultraviolet rays of the sun which broke up the water molecules in the upper atmosphere into hydrogen and oxygen. Whatever may be the initial source of the oxygen in the atmosphere, what is important is that the plants are now augmenting the oxygen supply by

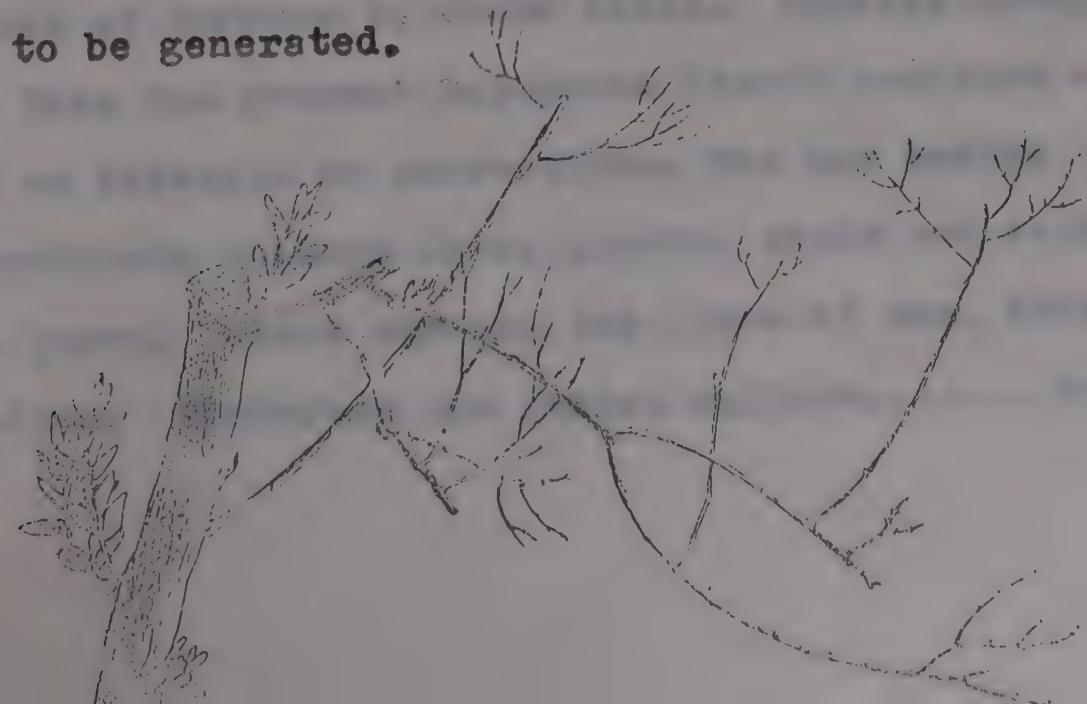


photosynthesis"(6). Forests also play a vital role in conditioning weather. When the atmosphere is too hot, plants cool the air supplying water vapour through transpiration. When too cold, the metabolic processes in plants generate warmth and reduce the intensity of cold. Soil land water conservation, regularisation and distribution of rain fall, sustained supply of water to streams and rivers to keep them perennial, maintaining water table high, providing homes for large varieties of wild life and catering to the needs of the population are other services rendered by forests. It follows that more and more forests have to be grown for reducing the atmospheric temperature which is dangerously increasing. Hitherto forest was considered only as a source of revenue to the exchequer by way of timber and other products. Even those in the administration are mostly in the dark as to the multifarious benefits derived from forests and the principles of forest management based on sound silvi culture. It is so because forestry used to be taught only to the benefit of foresters. General education curriculum is of no help to people to develop interest in forest - consciousness. Even persons at the official level pass statements which only show their ignorance of scientific forestry and related topics. In Kerala it was the Silent Valley issue that sparked interest among the public in environmental problems. Seminars, discussions and media publicity attracted attention of many. Nature and Forestry clubs, social and nonofficial organisation like the Frestry Board



and various other forums now provide occasions for inculcating in the minds of the people real interest in trees and forests. However it has been too late. Forests have suffered irreparable damages already. A "political will" is yet to generate. "Forests are dying. Those luxuriant woods unaffected by the cancer of industrial toxin are being maimed by wood-scutters. According to spectrum, the British Science journal, the rate of continuing deforestation is estimated at between 20 and 50 hectares per minute. Time (sept. 16, 1985) points out, the disease strikes selectively but with deadly effect(7)".

In countries like the Philippines, Korea and China, considerable expansion of forest could be made with people's participation and strict legislation. The parties in power were really interested and hence the result. It is an example of political will. In China, through commune forests the area under forest is now double what it was fifty years ago. But sad to say when such herculean efforts were on other countries, in India political go and "Political will is yet to be generated.





### C. PAST HISTORY

"The major problem confronting developing countries, particularly India, is the galloping population and the consequent need for more food, shelter and clothing which is depleting India's major resources at a fast pace. To provide these basic necessities of life we are carrying out urbanization and industrialisation at a great speed. A natural consequence of this is the sharp degradation of environment in Indis" (8).

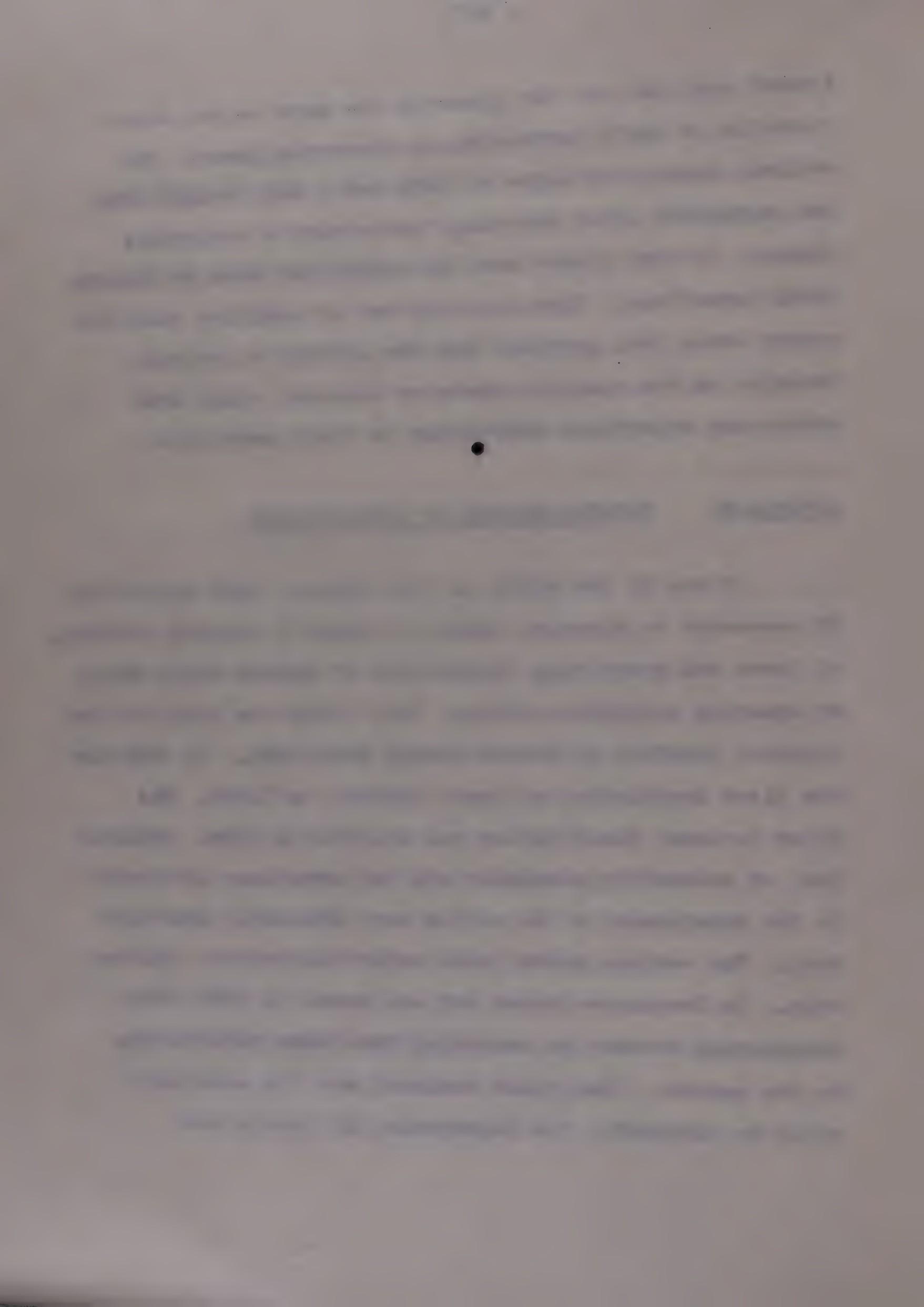
In ancient times, population being low, the requirement of land for habitation was limited. Hence large areas remained forests. When population increased, more land was needed and forests were cleared. There upon clearing of forests kept pace with increase in population. History tells us of vast forest areas where no forest exists now. Alexander the great who invaded Indis in 326 B.C. is said to have built a fleet of not less than 2000 ships of different sizes with timber and sailed down the Thelum river. Now there are no traces of forests in those areas. Similar examples are many. Even the present Rajasthan desert was once a dense forest as revealed by excavations. Man has reason to cherish much gratitude towards tree, plants, seeds and even the humble grass. These sustain the lives of men, animal and bird alike. Therefore the Indian culture.....has always



looked upon the tree and plants of the earth as the manifestation of God's protecting and preserving power. The ancient savants and sages of India had a deep insight into the mechanisms which determine the balance of ecological forces. If they didnot have the scientific facts to justify their preachings. They certainly had an intuitive power and common sense that provided them the ability to propound theories on the complex aspects of universe, which even modern-day scientists acknowledge as truly remarkable.

Article:2. PRESENT HISTORY OF DEFORESTATION

It was by the middle of 19th Century that rulers felt it necessary to exercise control in order to regulate felling, of trees and preventing, destruction of forests aimed mainly at ensuring sustained revenue. Very little was known of the indirect benefits of forests during those days. In 1855 the first legislation on forest appeared in India. The first National Forest policy was declared in 1894. Principles of scientific management and the importance of forest in the development of the nation were officially acknowledged. The various states under native Rulers also followed suit. In Travancore Forest Act was passed in 1867 after demarcating forests and reserving them under notification in the gazette. The policy declared was: "no more land would be assigned". The destruction of forests came



to a halt and the condition continued till independence.

It was during the British regime that effective steps were taken to bring forest administration under uniform pattern, giving priority to conservation and regeneration. A Forest Research Institute was started at Dehradun. Forest colleges were also opened at Dehradun and Coimbatore for training Forest officers. Now, each state has a Research Institute and schools to impart training to foresters and guards.

After independence, conditions changed. Forests were found an easy, prey to satisfy vested interests under political pressure. For anything forest was allotted setting aside technical objections. "On November 10, 1980 India has passed several statutes recently for the protection of environment. The recent ones are Insecticides Act, 1968, wild life protection Acts, 1972-86, water pollution less Act, 1977, Forest Act, 1980, Air Act, 1981 mention may also be made of the Bhopal Gas leak Disaster Act 1985 and Narcotic Drugs and psychotropic substances Act, 1985. Of the recent statutes the most important is Environment Act, 1986. India is one of the few countries which has anti-pollution and protection of environment law existing even in first half of the twentieth century"(9).

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a. Future forest policy against deforestation.

The first national forest policy of independent India declared in 1952, laid down that one third of the total land area should be forest-cover. But the actual position then was below 30%. In order to make up the deficit, it was suggested that planting trees on lands outside reserve forest could be encouraged. It was with this in view that the illustrious sree K.M.Munshi, introduced "Vanamahotsava" to be observed during july every year commencing from 1952. Thereon Vanamahotsava remained but an official exercise ; people's participation was very little. Few 'Forestry' that followed brought wonderful results in some states. Gujarat and Tamil-Nadu are examples. In 1980 a massive tree planting programme under the name 'social Forestry' was launched all over India, the idea being to encourage people to plant more trees supplying seedlings free of cost. Creating awareness among people is also the object of this scheme. Forestry clubs in educational Institutions are part of this scheme. Seminars, study tours, short term courses in forestry to social workers and members of local bodies, film shows etc. form part of the programme. It has given good results (10).

b. History of deforestation in Kerala.

In the beginning of the 19th century, about 75% of



land area was under forest in Kerala. In the beginning of 20th Century it was 50%. Increase in population and consequent need for more land under plough necessitated clearing forests. During first three decades of this century the percentage still fell and touched 35%. This shall continued and now the area under forest is below 24% only. The absence of a strong state forest policy came in handy for the land hungry to gain possession of forest land through political influence. It will be interesting to know how 300089.km could be deforested in three decades. During the second world war there was dearth of food grains. Fertile lands from forests were distributed among people on temporary lease to raise food crops. It was "Food Production" in Travancore and "Grow more Food" in Cochin. Before the expiry of the less popular governments came to power, A series of commissions and committees were constituted to study and report on what could be done in the case of these forest cultivators. But no decision could be made. People got time to make permanent improvements and stabilise their possessions. Encroachments also started. In the meantime allotment of land from forest was made to several categories like political sufferers INA personnel, servicemen, those evicted from road porambokku, project areas etc. Colonies under different tables also sprang up. All these created a general impression among the public that forests, once in



possession, could be possessed without the fear of eviction. This promoted more and more encroachments.

Instances are not rare when forest suffered for the satisfaction of vested interests and for the gain of political ends. The colonisation programmes launched in 1950s were mainly for such purposes. To cite only one instance, a large scale colonisation programme was initiated in the High Ranges, (Devicolam, Peermade Hills) early 1950, letting in people from plains who were allotted 5 acres each. It was not to provide land to the needy and landless. The object of the scheme was to increase the Malayalee population above that of Tamilians who were workers in Tea and Cardamom estates. It was directed by a politician turned revenue officer. The result was destruction of beautiful evergreen forests, the cardamom Hill Reserve. This adversely affected the ecology of the area and cardamom estates failed to yield as it did in the past. Since there was no proper survey and demarcation prior to allotment people took possession of it and expanded their lots in due course. Fresh waves of people came to occupy more and more of forest lands. Thus all except pattah lands were brought under occupation. Being on top of hills, soil erosion was very high and the land became incapable of producing any agricultural crop. "So people turned to ganja cultivation. There are frequent reports regarding destruction of ganja plantations by Excise and Narcotic parties"(11). These areas-Cardamom Hill Reserved



forest are under the dual control of Revenue and Forest Departments. The former is the owner of the land while it is the latter's duty to control and protect the forest cover. This unusual position went a long way in the destruction of forests and prevalence of Ganja cultivation. This dual control could be ended much earlier; but was purposely delayed and is still not considered. These hill ranges abound with streams but clearing of forests has resulted in the drying up of many of them.. Their perennial nature is lost and scarcity of water during non-raining seasons and increase in temperature have been the outcome.

The Rehabilitation plantations (rubber) of punslur to provide employment for repatriates from sir Lenka, extensive rubber and other plantation under plantation corporation of Kerala and oil palm plantations of oillpalm Indie Lted are all in reserve forest areas, cleared for the purpose.

#### c. Water and Air Pollution By Industries In Kerala.

Though Industries are few, all major rivers in the state are under dangerous threat of pollution caused by effluents drained from industries. The pollution of Chaliyar river water by Mevoor Gusalear Rayons Factory and pollution of atmosphere over the entire walekot panchayat resulting in lung disorders of the local people has already attracted popular attention. Same is the case with some other rivers.

the first time in the history of the country. It is a  
matter of record that the first American who  
was ever sent to prison was a Negro, and he was  
sent to prison for the first time in the history of  
the country. The first American who was ever  
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was a Negro, and he was sent to prison for the  
first time in the history of the country.

News print Factory at Vellur, cement Factory at Pallom, Travancore Electro Chemicals at chingavanam, Industires of Vdyogamandal, Pamba Sugar Factory, Punalur paper mill etc.,.. cause both water and air pollution at different levels.

Air pollution can to a great extent be controlled effectively by planting trees. This, in the long run, will also reduce the intensity of water pollution by making the supply of water perennial and in improved quantum. Each tree acts as a reservoir.

d. The Need of Political will and Public will.

Now that clear felling in forests has been stopped since 1982 and there is restriction in clearing forest for non-forestry purposes, whatever forest is left can be preserved if only there is "political will". There is sufficient public awareness also. Taking advantage of the present tempo, intensive propaganda and encouragement to tree planting should follow. It will be economical to plant trees on farm lands as timber is very highly priced and much in demand. It is more so with teak which is an all purpose timber and can be grown with ease. Incidentally 1991 is declared as Teak year by government to commemorate 150th year of Teak planting. Planting different species on private holdings creating a green canopy will go a long way in conditioning weather and providing a pleasant life. Now that air pollution is at a steady increase on account of vehicles all over the country, planting trees will go a



long way to reduce the evils of atmospheric pollution by, smoke and dust.

Industries will provide employment. There is pressing demand for establishing industries and our political leaders are bargaining with the centre for it. But only few think of the environmental problems in advance. Before pilating any project, parallel studies on the influence on environment should be conducted and remedial measures designed and incorporated in the project itself and strictly implemented. Taking care of the environment is taking care of life on earth. let us not forget the warning given by Mehatma Gendhi "Industrialisation is going to be a curse to humanity".

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N.B. Air, Water, Noise pollution are mentioned in Chapter II.

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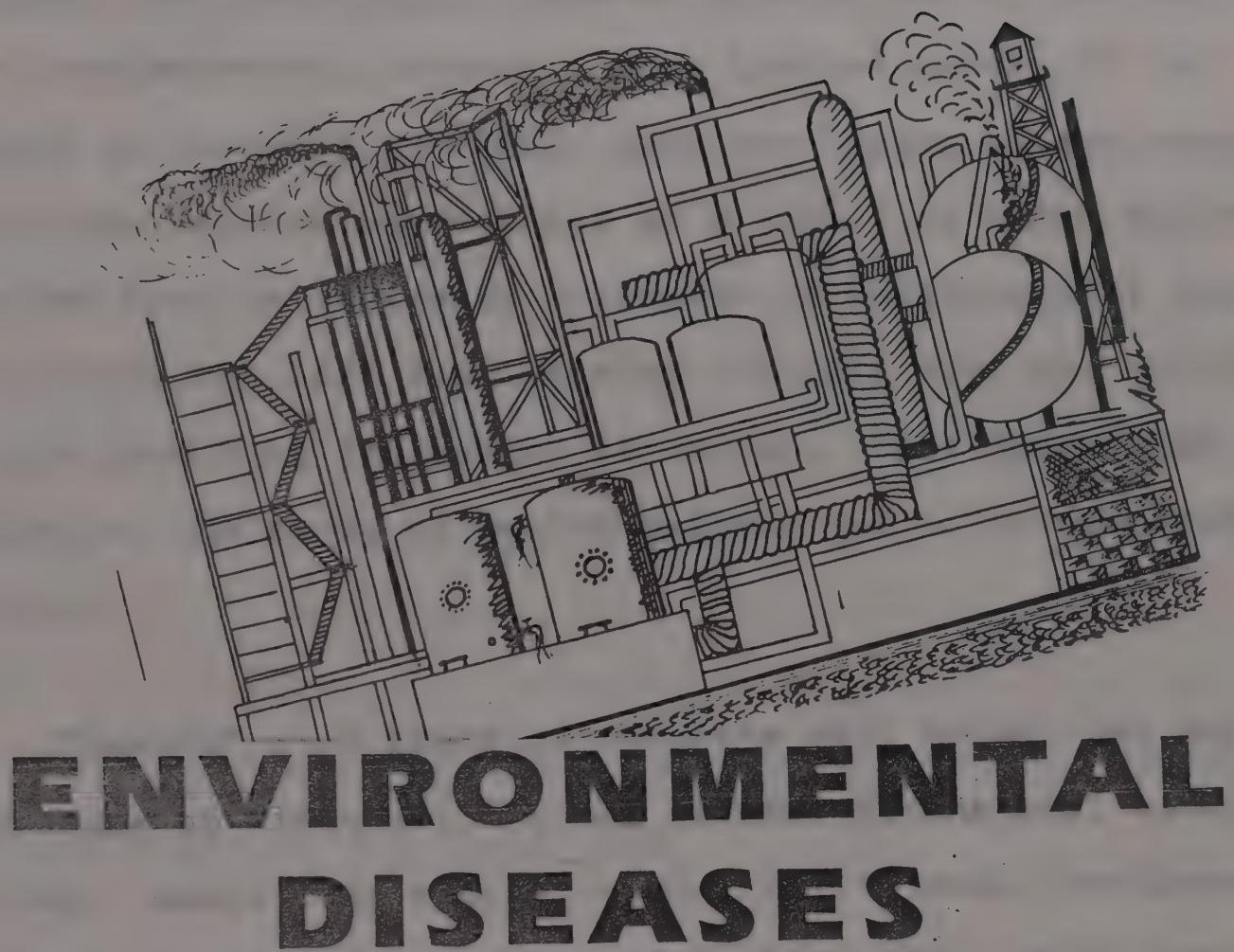
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## **CHAPTER - 2**





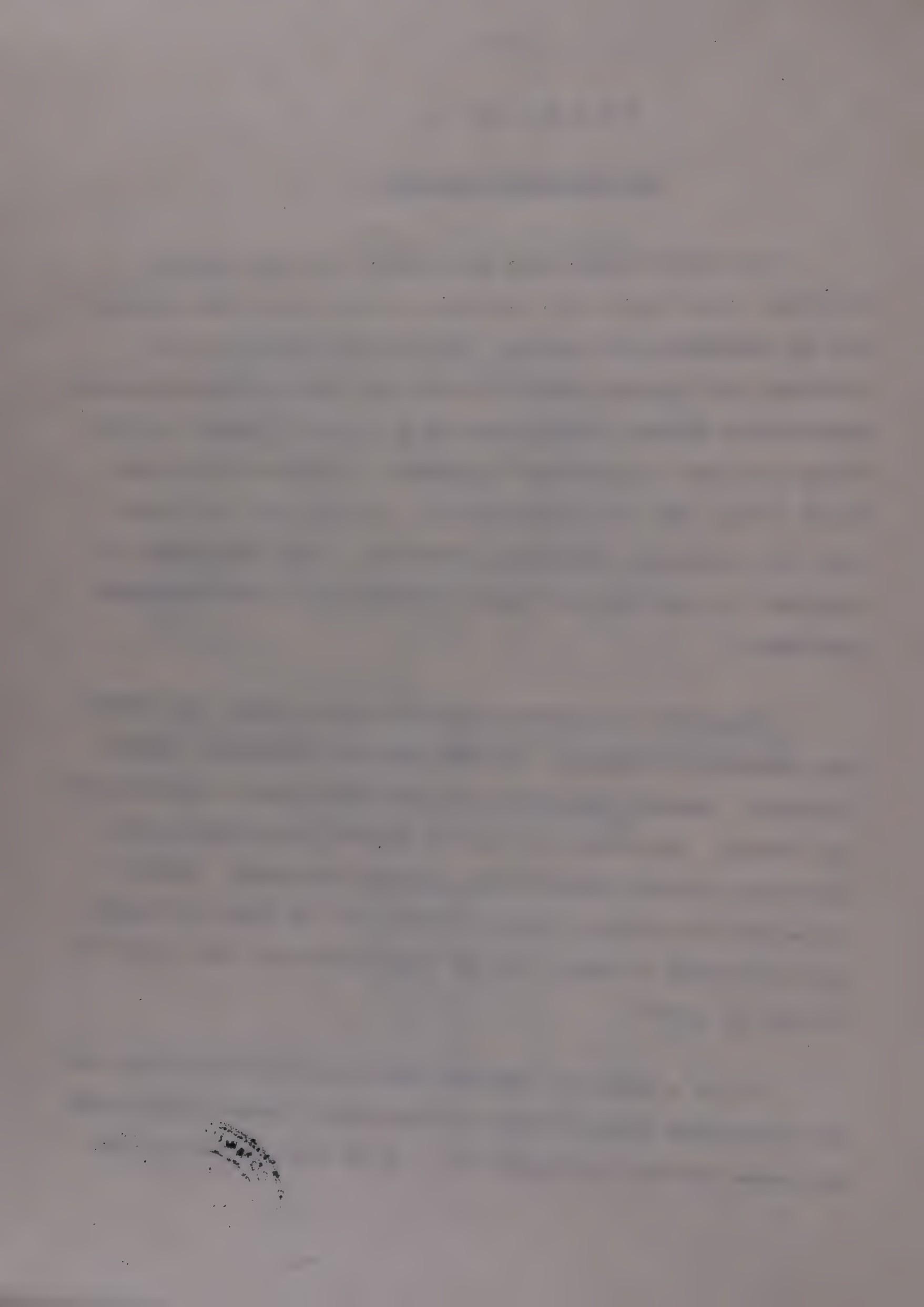
## CHAPTER II

### ENVIRONMENTAL DISEASES

In a broad sense this is a section in the field of medicine, that deals with diseases arising out of the influence of environmental factors. In a limited sense, it is confined to diseases resulting from the impact of environmental degradation factors which arise as a result of human activity. There has been an increased awareness of environmental problems during the last four decades and all over the world they are receiving increasing attention. This discussion is confined to the study of health hazards due to environmental problems.

"Health" is a state of complete well being, not merely the absence of diseases. It has several dimensions, namely physical, mental, spiritual, social nutritional, environmental and sexual. According to the old English term health was a condition of being "hale" that is safe and sound. Webster Collegiate Dictionary defines health as "the state of being hale and sound in body, mind or soul especially from physical disease or pain".

It is a state of relative equilibrium of body form and function which results from its successful dynamic adjustment to forces tending to disturb it. It is also defined as the



state in which the mental and physical activities of body are adjusted satisfactorily to the environment. To be in health means much more than freedom from disease and discomfort. It includes normal functioning of all parts of human organism resulting in physical strength and vigour, mental stability and satisfaction with life. J.F.Williams defines it as the quality of life that enables the individual to live most and to serve best. This definition suggests that health is capable of enrichment or deterioration, that health at its best is a more realistic concept for all reasons than the mere avoidance of disease, and that the proper goal of all health teaching is the finest kind of individual living. According to world Health Organisation, health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". The inclusion of 'spiritual' well-being has been suggested, but not yet found place in the definition.

Health implies a sufficient reserve of physical strength, abilitys and endurance, as well as mental poise to meet the demands of everyday life. The healthy individual is characterised by:-

01. Sense of well-being.
02. Ability to work efficiently and with enthusiasm.
03. Cheerfulness.
04. Self-confidence.
05. Self-control.

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06. Absence of disease and physical discomfort.
07. A wholesome mental attitude.
08. Freedom from unnecessary anxieties.
09. Courage to face reality, and ability to act with others in harmonious groups.
10. Wholesome fatigue at the end of day with restful undisturbed sleep at night.

Environment refers to the conditions within and around the human body or any organism which affect behaviour, growth and development of life process directly or indirectly, including those with which the human body interacts. The subject under consideration confines itself to external environmental factors and they are grouped under the following heads - namely, physical, chemical, biological and socio-economic-cultural factors.

Physical: Temperature, wind, rain, dust, soil, open-space, energy, noise, debris and radioactivity.

Chemical: Water quality, air quality, solid waste (gases) odour, energy sources, material and chemical.

Socio-Economic-cultural: Population, economic situation, housing, health and hygiene, education, sanitation and basic facilities.

Human health has long been known to depend on an interplay of heredity and environmental factors. With advances in science and Technology, we have been able to overcome, to



some extent, the infections diseases which are due to the biological component of environment. But other chronic degenerative diseases, and others due to degective growth and development have emerged as foremost killers of humanity. These are no longer considered to be entirely due to heredity or inevitable accompaniment of ageing. Instead they are attributed increasingly to particular dietary and social habits, life style and other risks, of environmental origin. Many of these factors that affect the human body and mind are produced or controlled by humans themselves. They include physical and chemical agents in the air, water, food, drugs, cosmetics, consumer products in the house, in the work place and in the environment atlarge. The Environment thus comprises innumerable risks in untold combinations. Furthermore, because these environmental factors interact in complex ways, the ultimate impact any one factor may depend on other that are present and the conditions under which they are encountered. All health issues when pursued deeply are seen to lead to the environment.

It is not possible to deal with all medical problems of environmental origin in the limited space of this paper, and hence diseases attributed to major environmental degradation states occupation hazards have been avoided. Not only are they more specific in nature but also they require expansive space for discussion.



## PREVALENCE

The clinical discipline of environmental medicines, largely unstudied, untaught and unpractised in most places of the world, as recently as a decade ago, underwent unprecedented rejuvenation in 1980's, as a result of increased awareness and occurrence of environmentally related diseases. In most cases, they manifest slowly and imperceptibly, but rarely we have catastrophic environmental events like the Bhopal gas Tragedy, the Chernobyl Nuclear accidents and the gulf war which have brought in sudden death and chronic diseases to thousands. World wide attention was drawn to these accidents, but though we seldom realise, many more mini Bhopals, mini Chernobyls are common in many developed and developing countries, causing deaths and diseases. The extent of pollution of air and water in all the metropolitan cities of India show a marked increase during the last once decade, as a result of increased automobiles, industrialisation and population and they have resulted in many environment related diseases.

In the state of Kerala, Vypeen and Punalur liquor accidents raised the conscience of the people and there was much hue and cry in the media and legislature. But we don't realise that hundreds of thousands of persons are affected by illicit liquor and even by genuine one, many of whom succumb to alcohol related diseases. In the backwaters of Kuttanad, the hospital records have established a steady increase in gastrointestinal diseases due to intake of water which has



been contaminated and polluted by stagnation and excessive use of fertilizers, pesticides and fungicides. This was reported by our eminent scientist Dr. M.S.Swaminathan.

A study of the mortality statistics of Kerala highlights an increase in accidents (which is also environmentally related) and environmental diseases. High incidence of respiratory diseases like Asthma and Bronchitis around the industrial belt of Alwaye, also speaks of the adverse impact on the health of human beings owing to pollution by industries. In the different parts of India, increased incidence of certain infectious diseases like Malaria, Viral Encephalitis and weiles syndrome, have been reported and they have been attributed to environmental changes. Can we not attribute the emergence and spread of AIDS too to the impact of certain socio-cultural factors- also of environmental nature?

#### CLASSIFICATION

Environmental medicine, because of its current importance, has occupied a good section of medicine text books, yet no satisfactory classification of diseases is available. Environmental problems have been classified differently. One attempt has been to group them together according to their situation, namely, global( green house effect, ozone defect etc), regional(acid rain, ocean pollution), national (deforestation in India,desertification in sub Sahara region), local(pollution of air, water and soil due to industrial activity) and



individual (moral degeneration). For consideration of diseases related to environmental changes, the following classification appears to be satisfactory.

01. Green house effect.
02. Ozone Depletion.
03. Deforestation, desertification, soil erosion.
04. Pollution of air, water, soil, sound by toxic waste-disposal.
05. Acid precipitation and rain.
06. Depletion of ground water.
07. Biological diversity.
08. Ocean bed resources, non-renewable resources.
09. Energy crisis.
10. Biological weapons research and Nuclear Arms race.

I am not attempting to go into the details of these environmental degeneration states, but shall continue myself to their health hazards. Adverse health effects can also be grouped into:-

- i) Predictable or speculative;
- ii) Possible and potential;
- iii) Proved.

#### Article:1. Green House Effect.

The term green house effect refers to the rise of earth's surface temperature(global warming owing to the



accumulation of carbondioxide and other gases in the atmosphere. Carbondioxide is our society's single largest waste product the estimated world production in 1988 came to 5 billion metrictons. "It recognises that emissions of green-house gases from developing countries would increase if they are to achi-eve development in the next few years" (3).

Consequences for health of the global warning are potentially great but are currnly speculative. Apart from the increase in tiredness felt during warm weather know as tropical Asthenia, owing to excessive sweating, people have lower resistance to common stresses of life. This will chiefly affect elderly people whose number is increasing rapidly, chronically ill and debilitated persons and perhaps infants. The magnitude of the increase in imortality is not yet clear. Air conditioning could reduce the nuber of sufferers, but it expends much energy and increases consumption of fossil fuels that create green house warming. The increase in mortality may also be offset to some extent by the decreased number of deaths from hypothermia and cold.

It has been predicted that with global warming, respiratory irritants in the atmosphere will further pollute the air, causing increased morbidity and mortality from lung diseases such as bronchitis, bronchiectasis, asthma and chronic obstructive lung disease.

In a finding that has shocked its own scientists, the



National Aeronautics and space administration(NASA) has found that there has been no green house warming in the last decade.

The finding, based on data collected from 1979 through 1988 by the TIROS-N series of weather satellites, measuring the earth's temperature precisely with instruments probing the atmosphere from space, has been published in the science Magazine. This is significant because 1979-88 was one of hottest decades, with six of the warmest years on record.

Mr. Roy W.Spencer of the marshall space flight centre Huntsville Adabma, coauthor of the study, said: "we found that large year to year changes in temperature and over that 10 years period we saw no oong-term warming or trends will turn their regions into rich farmland will be disappointed.

However, Mr.Christy a climate research scientist at the university of Alubama and who presented the study along with his colleague, caustioned against hasty misuse of the findings. About the long-term global warming, it(the finding) does not say anything that does not means that warming is not occurring.....

#### a. Ozone Effect.

Only in the past few years have scinetists understood that the gases liberated in the industiral processes(like chlor fluorocarbons, sulphur dioxide, nitrous oxide) reduce the Ozone layer in the stratosphere, which forms a shield,



protecting humans and other tiny beings from the damaging effect of ultraviolet (UV) radiation. UV light is the portion of the electromagnetic spectrum between 200 to 400 nm which is artificially divided into subregions of A,B and C. UV-C includes wave lengths from 200nm to 290nm and is the most damaging to life, but ozone effectively blocks it from reaching the earth surface. UV-B includes solar radiation of wavelengths from 290 nm to 320 nm which is many times more effective in inducing Erythema (redness of skin) than UV-A whose wave length is between 320 nm and 400nm. DNA and aromatic amino acids in human cells absorb maximal amounts of UV-B and minimal amounts of UV-A. The diseases produced by UV are chiefly attributable to disruption of DNA and protein. UV-B also has been found to influence the immune system which is an important feature in the defence of the body against any noxious agent. Breakdown or weakness of the immune system makes a person more susceptible to many infectious diseases and cancer.

Though UV Radiation cannot penetrate deeply into the human tissue, critical organs for UV exposure are the eyes and the skin. The cornea, which is relatively opaque to UV light, and the lens of the eye are particularly liable to UV damage. Acute exposure to UV rays can give rise to painful photokeratitis and conjunctivitis; 'welders Flash' due to rays from welders are light and 'Snow - blindness' from sunlight reflected from the snow are examples of acute



exposure damage. Prolonged and chronic exposure can damage the cornea and cause cataract of the lens. It is feared that higher prevalence of it in old age, and higher incidence in younger age groups may be the effects of ozone deplet.

As mentioned earlier, breakdown of the immune system is the most dreaded sequela of UV radiation and this can lead to increase in infections diseases and also certain types of cancer in which the immune system plays a vital role as in lymphoma. Depression of immune system becomes more important when people are overcrowded, underfed, and are living under most unsanitary conditions- a common observation in developing countries.

b. Climatic change - Deforestation, Desertification, soil erosion.

Combination of global environmental changes like green house effect, ozone depletion, excessive unchecked human activities in the name of development and exploding population are believed to be responsible for climatic and adverse topographical changes affecting life on earth: The effects of these changes on the human race are both direct and indirect. Apart from the changes in the flora and fauna and adverse effects of biological diversity, food production too suffers. The main impact of these is socio-economic: There have been large scale migrations of people in sub Saharan regions including Ethiopia, many of whom succumbed to



starvation and epidemics. Similarly, the tribals and villagers in the Narmada valley project area with the whole-hearted support and co-operation of well meaning and farsighted people outside are agitating for their adequate rehabilitation as well as against the immense damage to ecology that would result from the execution of the project.

Another problem consequent on these changes has been the emergence of certain infectious diseases, in different parts of India. They are believed to be due to water logging of the areas and changes in the salt content of water. Malaria is increasing in some parts and certain types of Arthropod-born encephalitis are reported from some parts of India and they have been attributed to changes in the forest cover of the locality. Well's syndrome(a bacterial disease affecting liver, kidney and brain) has been observed in increasing numbers in certain pockets in Kerala(Kottayam and kozhikode districts) and Tamil Nadu.

Changes in microflora and microfauna in these affected areas cannot be discredited. The recently noted fish disease (Elizzotic Vleerative syndrome) in kuttanad backwaters is another gloomy example. Fish there started dying in large numbers and the calamity appears to have made authorities aware and alive to the problem of stagnation and desalination of the backwaters of these places. It is at present viewed as a socio-economic problem and it will definitely



prove to be a health hazard with political overtones.

c. Hazardous toxic waste and pollution of air, water and soil.

Hazardous toxic waste is a matter of great concern as they are responsible for major environmental problems.

Main sources are:

1. Burning of fossil fuels for energy.
2. Industrial activity.
3. Microbe, plants and animals, agricultural activities.
4. Geochemical activities.

One of the main sources of pollution and toxic waste is the burning of fossil fuels such as coal and oil, which are mainly used in stationary power stations and mobile automobiles. Carbon dioxide, sulphur dioxide and nitrogen oxide, the chief causes of acid rain and smog, and other toxic gases like methane and hydrogen sulphide are produced by burning of fossil fuels. Automobiles using oil release lead to the atmosphere contained in petro. All developed countries are trying to minimise the polluting effect of fossil fuels by removing sulphur and lead from oil and by incorporating catalytic oxidants in automobile engines which lower nitrogen oxide exhaust.

Toxic and hazardous substances enter the human body in different ways, through inhalation, ingestion or contact with skin exposure to them can be voluntary, as in the case of tobacco, alcohol and drugs, or involuntary: catastrophic



(eg.Bhopal gas tragedy) or gradual(eg.Love canal accident in U.S). These toxic substances which enter the body by different ways affect different systems and functions of the body, producing a wide spectrum of diseases. We may discuss some of them.

#### Article:2. Respiratory Diseases.

Respiratory system is most commonly assaulted by environmental pollution as we breathe each day 10,000 to 20,000 liters of air or approximately 35 pounds of air which contain myriad, gaseous, particulate and fibrous pollutants. Inspite of the chronic exposure to the pollutants, respiratory system is not much affected as it is endowed with efficient defense mechanisms. Occasionally accidental inhalation of toxic substances overcomes the defenses.

When considering the inhalation injury, it is useful to divide the respiratory tract into 3regions.

- i) Nose and extrathoracic passages upto glottis (throat)
- ii) Conducting airways including the trachea and bronchi upto ferminal ones..
- iii) Pulmonary parenchyma where gas exchange takes place.

**Acute Exposure:** The most notorious industrial Bhopal accident of 1984, which resulted in the death of about 3000 people and crippled tens of thousands is a classic example



of acute respiratory diseases, following exposure to poisonous gas, methyl isocynate. In the year 1952, in England inhalation of poisonous smog resulted in the death of about 4000 people. In addition there are many instances of accidental exposure to poisonous gases.

**Chronic exposure:** The response of the respiratory tract depends on the site where the pollutants act.

**a.Nose:** Chronic irritation of the nose leads to inflammation of nose with discharge. This may lead to blocking of nose and mouth breathing. Hay fever resulting from pollen is a common problem. More commonly, exposure to road and domestic dust result in chronic nasal discharge.

**b.Disease of airways:** Several airway responses can occur, and the commonest is broncho-constriction(narrowing of the airways) giving rise to Asthmatic attack. When secondary infection takes place, the condition becomes chronic bronchitis. If neglected the condition can lead to very crippling disease known as chronic obstructive lung disease. Many persons who have survived Bhopal accident are affected by this disease. Before clear'air act 1956' most of the Industrial centres in England had very high incidence of chronic respiratory tract disease. The problem of Asthma and chronic Bronchitis is high in the industrial belt of Alwaye. During summer season, the incidence of Asthma is higher, owing to increase of dust from roads.



c. Parenchymal Disease: If particles are organic,

they may induce sensitivity reaction in the lung parenchyma and the condition is known as Extrinsic allergic alveolitis. The common symptoms are cough and breathlessness and disease is progressive if not protected from the pollutants.

d. Pneumoconiosis: Persons working in certain industries and in some mines have high risk of exposure to irritant particles and fibers, and they tend to develop chronic respiratory diseases unless protected. These diseases, are collectively referred to as pneumoconiosis. Most commonly damage in the parenchyma and the symptoms are progressive breathlessness and loss of weight.

e. Health hazards of ionising radiation: Health hazards of ionising radiation are often important news in the media and these have come into focus after the Chernobyl accident and with the raging controversy over the safety of nuclear plants. Man is subjected to different sources of radiation. They are natural, cosmic, occupational, medical and accidental.

i) Natural: All radiations apart from cosmic rays reaching the earth are produced by natural radionuclides. They are divided into two: series radionuclides- that decay through a series of nuclides to a stable isotope of local, and non-series nuclides- that decay directly to a stable nuclide. The series nuclides are three- uranium, actinium and thorium.

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They are the principal sources of human exposure to radiation from earth into air and water. It is now recognized that radouemanating from these substances is a significant contrebutor to the dose incurred from background radiation. The contribution of cosmogenic radionuclides to the population dose is very small, despite the number of cosmogenic radio-nuclides produced in the atmosphere. The levels of these radionuclides increase with altitude, but the dose is a mere fraction of that received from charged particles.

ii) Cosmic: The atmosphere absorbs not only ultraviolet radiation but also cosmic radiation. Cosmic radiation consists in galactic cosmic rays, intermittent solar particles that result mainly from the interaction of the galactic cosmic rays and atmosphere. The atmosphere is an effective shield reducing the cosmic radiation doses by perhaps three orders of magnitude.

iii) Occupational exposures: Those who are employed in nuclear power plants, medical radiology, industrial radiology and a number of activites that are mainly associated with research, are exposed to radiation. Here the protection is so secure that there is hardly any risk of over exposure except in cases of careless handling or unsafe appliances.



iv) Accidental exposure: Since 1944 there have been 305 world wide accidents that resulted in significant radiation exposure. Six of them were reactor accidents of which chernobyl windscale, and three mile island have been notorious.

v) Medical exposure: More than 90% of the doses derived from man-made resources is from medical and diagnostic procedures. It has been estimated that 1% of all cases of leukaemia and 0.7% of all cases of breast cancer are caused by radiologic procedures.

i) Biological Effects of radiation: Different types of ionising radiation have varying degrees of damaging influence on the cells, and the most likely critical target structure in the cells, with the exception of some type of lymphocytes (type of white blood corpuscles) and certain stages of the oocytes (in chromosomal DNA). Ionising radiation induces a wide variety of lesions in DNA. The lesion, considered most likely to lead to chromosomal aberration and death, is double-strand DNA breaks. In many cell types, the radiation-induced damage results in cell death only if the cell goes into mitosis, and in some cells such as lymphocytes and oocytes at certain stages of development, death occurs in interphase

ii) Clinical effects of radiation: Two types of reaction are seen as exposure to radiation, early and late. Early



acute effects occur within the first few minutes up to 2-3 month following exposure to large amounts of radiation over a short period of time and are due to cell killing, impairment of cells function, inflammation, and infection. The brunt of the effect is observed in haemopoetic (blood forming) organ, gastro intestinal and nervous system.

iii) Late effects of radiation exposure:

a) Leukaemogenesis (blood cancer): Over a period of around 3-10 years after acute radiation exposure there is increased risk of the development of leukaemia, predominantly acute myeloid leukaemia other types of leukaemia are less likely to be increased by radiation exposure.

b) Carcinogenesis (cancer): Solid tumours are also induced by ionizing radiation exposure, once again increasing in risk as a function of increasing dose, but over periods up to forty and more years after radiation exposure. The commonest sites of radiation induced tumours are related to the sites in which cancer is most prevalent in the general population. There is inevitably a high incidence of skin cancer; increased incidence of other cancers of lung breast, bone and lymphoma following radiation exposures, has been demonstrated. For the establishment of permissible population and occupational exposure limits it is assumed that there is no threshold radiation dose below which no harm is caused, and the risk of inducing malignancy is assumed to be



proportional to accumulated radiation dose. Animal and human studies suggest, however, that as the radiation dose increases there is a departure from this inexorable increase in induced malignancy due to killing, by the additional radiation, of the transformed cells which presumably would have evolved into a malignant clone. As a guide, on best best human data, it is suggested that total body exposure of  $1^{\circ}\text{Cgy}$  (1 rad) gives at most a 1 in 6000 risk of the development of fatal malignant disease in a particular individual. Thus, uniform exposure of population of 1 million people to 1 cgy may result in the eventual development of about 165 fatal cancers against a background of 200 000- 250 000 spontaneous cancer deaths.

iii) Genetic damage: Radiation can produce both dominant lethal event and recessive changes not evinced in the first generation. However, with increasing radiation dose, an increasing proportion of those cells in which such transformations have taken place are rendered reproductively inert and cannot pass on their genetic macformation. Hence, somatic rather than genetic damages are the limiting factor in determining permissible radiation exposure to populations.

iv) Sick building syndrome: An unforeseen consequence of the fuel conservation measures that followed the oil shortage of the 1970's was the concentration of common pollutants in air tight buildings served by closed systems of



ventilation. In the late 1970's and 1980's out breaks of illness characterized by intractable upper respiratory symptoms, ill-defined central nervous system dysfunction, and low morale and productivity have occurred in countless offices.

Occupational Medicine: Discussion of Environmental medicine will not be complete without considering occupational diseases, which have markedly increased with industrial revolution. Given the breadth of the subject, we cannot discuss every important topic in occupational medicine, commonest are the lung diseases of which bronchial asthma is the commonest. Asbestosis, authracosis, silicosis, byssiosis etc.. are examples of lung diseases due to different dusts damaging lungs by divers mechanisms. Renal disorders (due to lead and organic solvents), blood disorders (due to benzene, metallic and organic solvents) neurologic disorders (due to organic solvents like n-hexane lead, arsenic, organophosphate compounds).

Noise pollution: Webster dictionary defines noise as Sound.... that lacks agreeable musical quality or is intolerably loud, harsh or discordant. Nobel Laureate Robert Koch said "A day will come when we will have to fight noise as inexorably as plague or cholera". Dr. Samuel Ross, ENT Surgeon said 'you may forgive noise, but your body will never'. These quotations amply explain the adverse effects of increasing menace of noise. Important sources of noise pollution



- are:
1. Industrial activites.
  2. Road and Air traffic.
  3. Loud speakers.
  4. Radio-transistor and cassette players.

Even though noise is annoying and frustrating, it is acceptable. The ear is an amazingly flexible organ, but it is not designed to withstand the strain of moder living. Hearing deteriorates with old age, but it becomes worse in persons who are exposed for prolonged periods to loud noise. Sudden intense noise, sudden gunshot, sound or dynamite blast can damage the ear instantly by tearing the tissue in the delicate inner ear. Unrelenting noise assaults can cuase hair cells to loose their resilience and die. They do not rege-nerate and the result is a gradual loss hearing. Besides exposure to loud noise for prolonged periods, as in the case of noise producing industries, there have been higher inciden-ces of psychiatric problems and high blood pressure.

Awareness: Prevention is better than cure. This dictum is applicable in all fields of medicine, but more so in environmental medicine and for prevention of environmental diseases the awareness of the acuteness of the crisis and education of people are most necessary. It is gratifying to note that during the last four decades, the world has been alerted to the deteriorating environment and this is evidenced by increased activities at all levels- global, regional,



national and local. At the global level, the united nations has taken the lead by observing many days and weeks to remind the people about the fast degenerating state. Many important bodies like Commission for environment and Development UNCED are active under the auspices of the United Nation.

Greens party originally formed in Germany has become important and influential in the political life of all European countries. President Bush has declared the importance of environmental protection. Pope John Paul II has named Francis De Assisi as the saint of Ecology. The theme of the world health organisation for 1990 was ' our plant our health', 'think globlly and act locally'.

Government of India has recognised the importance of environmental problems and has created the importance of environmental problems and ha s created not only environment department but also a Minister incharge of it. The Universities and colleges has introduced environmental subjects in the curriculum and have started courses related to environmental subjects for creating awareness among students, and Nature clubs, friends of trees society, environmental clubs and similar societys are functioning. During the last few years many such club and organisations have sprung up in different parts of the country (estimated to be about 400) to preserve the environment. Some environmental and antipollution acts have been passed and it is stated that many more may be enacted in the near future.



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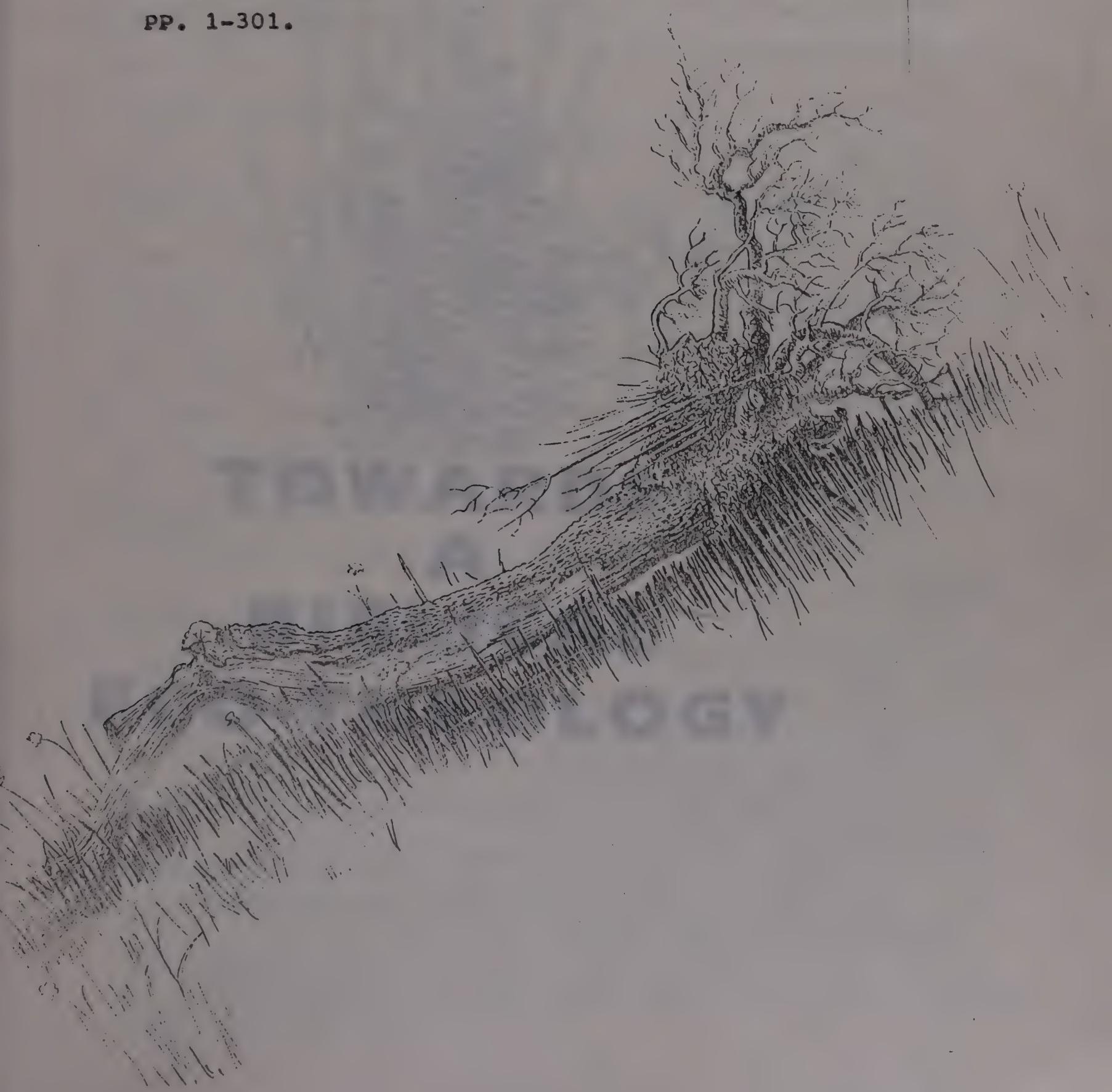
Earth Day (April 22), Environment Day (June 5), Tobacco Day (May last) and Wild life Conservation Week (October 2 - 9) are held all over the world.

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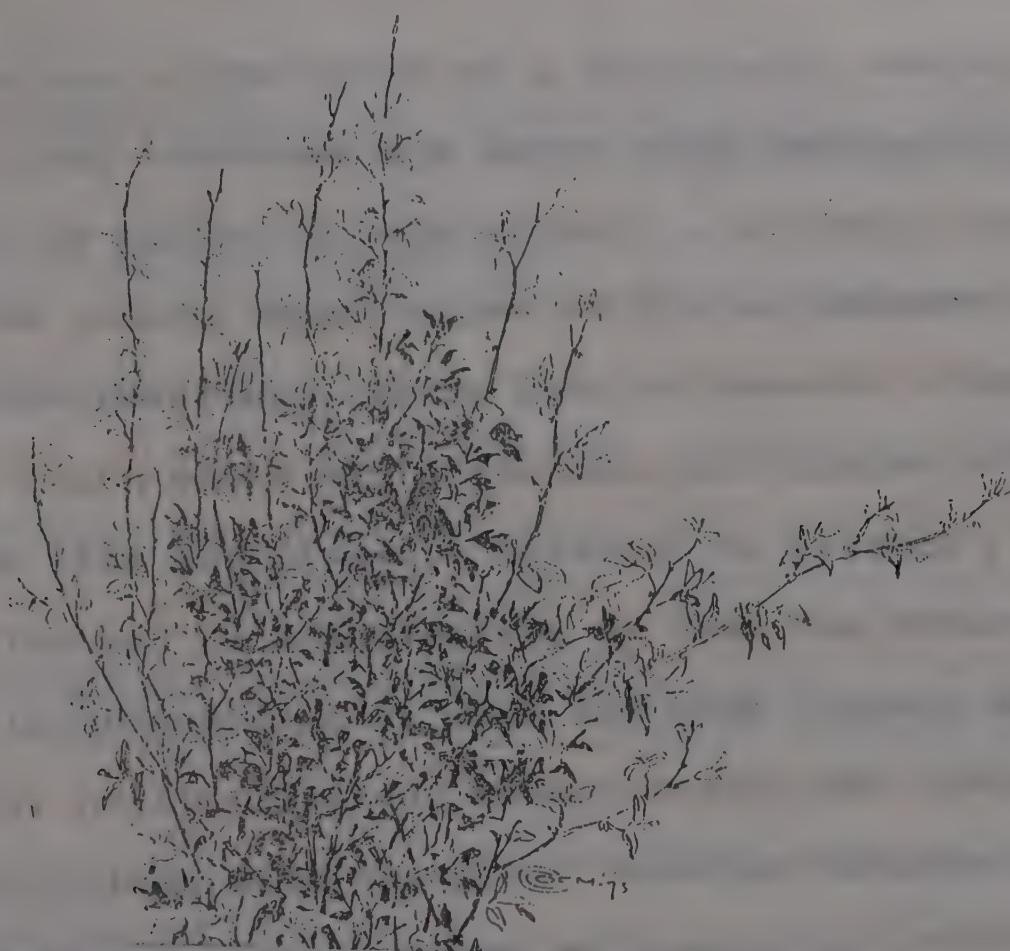
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## **CHAPTER - 3**



# **TOWARDS A BIBLICAL ECO-THEOLOGY**



CHAPTER III  
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TOWARDS A BIBLICAL ECO-THEOLOGY

We are on the brink of a frightening ecological disaster that threatens the earth with destruction and death. Our earth is suffering from illness and decay caused by humanity's greedy exploitation of its environment and ecological transgressions. It is heading towards a tragic physical death which would eliminate all traces of human existence from our planet. Advances in science and technology, instead of emancipating us from the dread of cosmic forces, is endangering us more and more through environmental pollution, health hazards, energy crisis and nuclear obliteration. Along with the great benefits achieved by science and technology, a whole series of unexpected and dangerous side-effects are unleashed and now threaten the earth with destruction and death. In the words of Jacques Ellul:- perhaps the new definition of the human being should be not 'the animal who creates itself', but 'the animal who self-destructs' (1). Appearing slowly and not very conspicuously at first, we do not become conscious of the way the ecological crisis is threatening our very existence. But as ecologists warn us, it has assumed an alarming magnitude today and is tolling the death-knell of human-kind on our planet. The gravity of the problem is more acutely felt in the poor third world countries where the inminence of ecological

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threat is always increasingly likened to the perpetuation of the world-wide, cruel economic injustice(2).

But what is most striking in today's picture of eco-systemic crisis is the sense of spiritual inadequacy to meet the challenge posed by the ecological crises. While Christianity with its "desacrilization" or "secularization" process emancipated its converts from the dread of cosmic forces, it deprived them of their age-old practice of communing with nature. The cosmic piety and the sense of cosmic morality began to degenerate into a hostile or manichean attitude towards the environment. The sacramental approach toward cosmic reality begun to degenerate into an instrumental theory of nature(3). The agapeic idiom of biblical Christianity "which justifiably invests the absolute with transcendental personhood, has been allowed, by contrast to diminish the world to a state of non-persona, cosmic forces meant merely to be mastered and moulded by man( after not by woman) to serve as a series of stepping stones to reach his make" (4).

Eco-theologians today are unsparing in their criticism of traditional biblical theology. They have concluded that it has been ecologically bankrupt. With its anthropocentric bias and its admonition to 'subdue the earth', it was largely responsible for the anti-ecological stance of conquest of nature and submission of the whole of creation

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to the level of more "objects" to be plundered and exploited. While emphasizing the "dominion" over nature, it forgot the "birds of the air and the lillies of the fields". It neglected the overall gospel picture God taking care to clothe lilies in the field and to provide for birds in the sky. In addition to this, the eco-theologians accuse traditional theology of an exclusive concern with "the other world" and "other worldly" salvation to the neglect of responsibility for this world and the human problems here and now.

Hence what we need today is a fundamental search for a new creative theological approach to respond to the challenge presented by the ecological threat. But any Christian ecological reflection must begin by looking to the Bible for the inspired light it casts on the problem. We need an adequate biblical theology of ecology. It is not easy to construct such an adequate biblical eco-theology, since the Bible first of all is not a unified sermon, but a whole library of work with various theologies dealing with various religious themes. Nevertheless, this difficulty should not be exaggerated. It is the task of theology to listen to the chorus of voices in dialogue and even in debate and to attempt to hear the message of God's word that has been conveyed to us in the Bible. The eco-catastrophe invites us to a re-reading of the Bible. It invites us to, what eco-theologians call, an "ecological reading" of the Bible(5). For so long we have been reading the Bible in an anthropocentric perspective and by doing, neglected an important religion's perspective



in the Bible, namely God's love and concern for the entire cosmos and human's co-creative stewardship for promoting the unity and integrity of the whole cosmos for a human life in harmony with nature.

What was behind traditional theology's ecological bankruptcy and manichean attitude towards creation? It was a series of interlocking and destructive dualisms that crept into theology when it started interpreting the Bible in the dualistic perspective of Greek philosophy. The basic conception of this dualism was the split between God and the material universe. As a result, God and the world were placed at opposite ontological poles. This vitiated the view of theology on nature human relationship from the organic to a mechanistic interpretation of the entire universe. Owing to the prevalence of this mechanistic way of looking at the world as a whole, the mastering or conquering of nature as something "to rule" and "to subdue", as recorded in the priestly creation story of genesis 1:28, was largely responsible for this "theology of domination". The assumption was that it is humanity's God-given task to exploit the earth and its environment to meet any human needs and desires. This approach to nature was greatly accountable for the generation of a blind technomania that is regardless of the environmental recklessness.



CRITIQUE OF THEOLOGY OF DOMINATION (Article.1)

There is a plethora of biblical literature against the "theology of domination" approach today. Human dominion over Nature as "subduing", found in the priestly narrative of the creation story, (Gen 1:28) was only one of the many streams of tradition (7). But this one aspect got an excessive emphasis in the theology of creation in western Christianity at the expense of the other important elements in the other biblical writings owing to the false dichotomic view of Greek philosophy in the light of which it was interpreted and formulated. This led to the ruthless and arrogant exploitative attitude of the westerners towards nature.

However, a close study of even this priestly narrative shows that the expression "imago Dei" found in Gen. 1:26-28 is used to express human's proximity to God and determines precisely the leadership role given to him(8). Human being is placed in nature as God's representative to rule over the rest of creation. Commenting on the relation between humankind's creation in God's image and its responsibility to 'have dominion' over all creation (Gen 1:26-30). Gerhard von Rad says "this commission to rule is not considered as belonging to the definition of God's image, but it is its consequence, i.e.. that for which man is capable because of it.... just as powerful earth kings, to indicate



their claim to dominion, create an image of themselves in the provinces of their empire where they do not personally appear, so man is placed upon earth in God's image as God's sovereign emblem. He is really only God's representative summoned to maintain and enforce God's claim to dominion over the earth(9).

The total context of Genesis 1: 26-30 shows that there is an implicit covenant which is explicitly made by God with creation wherein the human being made in God's own image was to entrust the creation to him to achieve the purpose of creation(10). Precisely in this relationship between 'being in God's image' and 'having dominion over the creation' do we grasp hold of a biblical understanding which may be here designated by the term "stewardship". The biblical synonyms for this concept are 'faithfulness', 'obedience', 'justice', love for God and one's neighbour(11). Thus the criteria for human's accountability before God are:

1. Potential to be God's representative, thus extending God's presence in the world and
2. The command to take delegated responsibility to God's creation(12).

The context of Genesis 1:26-30 thus speaks of our responsibility for creation. Exploitation of nature would be an abuse of stewardship and would constitute a breach of the covenant(13). The essential message here is that God in creating human in His image, made him free and



intelligent sharer in the governance and completion of His creation, but this intelligent power over creation is not autonomous, it is a co-creative, responsible stewardship(14). Thus the biblical perspective affirms that stewardship is not stewardship of one's own possessions but stewardship of what belongs to God. Stewardship is not a way of managing our possessions; it means rather that we care for what God has entrusted to us(15). Therefore there is no basis in Genesis 1:26-30 for assuming that human's dominion is in the sense of exploiting nature. His mission in the world is to complete creation (Gen 1:28). This a conclusion to the proposition stated in Genesis (Gen 1:26). Besides, a better translation of the verse: "Be fruitful and multiply, and fill the earth and subdue it" (gen 1:28) would be: "Fill the earth and possess it". There is no implication of brutal mastery or exploitation. Gerhard Von Rad considers that the term for human domination over the subhuman creation is remarkably strong, implying "tread", Trample", and "stamp"(16). This has been taken to mean that Adam is to crush lesser creatures under his foot, but the image of stepping onto territory also symbolizes "taking possession" without any implication of destruction. This is more in keeping with the picture given in Genesis chapter II, of human as the guardian and cultivator of the garden(17). In fact genesis pictures human living in Eden at peace with animals both feeding only on plants (Gen 1:29). The "dominion" of human over animals (Gen 1:28) is that of guidance, like a shepherd

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to his sheep. Throughout the Torah there are numerous provisions concerning care of animals and of the land (Deut.25:4, Ex.23:10-13).

Moreover, the repeated formula "and God saw it was good" (Gen.1:31) affirms clearly that all life-human, plant or animal have their worth and are blessed by God(18). Also, the Noahic covenant affirms the same. The scope of this covenant made with Noah as representative of human race is universal. Every human bears the image of God(Gen 9:6) even after sin. The harmony of human and non-human creation is now lost. God has now to take into account the possibility of human reverting to his claim of independence and trying dominion over creatures mindless of his stewardship. Therefore the providential care referred to in Genesis.8:21-22 is now extended to all humans and creatures. The new covenant "proclaims God's universal lordship over the creation, his care and concern towards it"(19). In this covenant too, we find a restriction put on human's exercise of freedom. He is to be a steward (Gen-9:4-6). He is given the responsibility of a steward, he is to respond to God in the name of creatures, since they cannot respond themselves(20).

#### a. Biblical Theology Of Co-creative Stewardship.

More than all these arguments, the Yahwist tradition of creation story shows that the charge of the earth that God entrusted to humankind is one of responsible stewardship or



trustee-ship. Humans are told to fill the earth" and "care" or "Keep" it, (Gen 2:15) with the responsibility of a gardener, who need to show great sensitivity the resources available and the bounty(21). Thus a closer look at the priestly narrative and the Yahwist narrative, shows that the function of these two narratives is to exhort the human being to exercise trusteeship in relation to nature and to society(22). He has to 'fill' and develop the world and at the same time watch over it, "keep" and preserve it from exploitation(23). "The ethical responsibility of the human consists in continuing God's work of creation by continually transforming the earth, by tilling it and making it ever more livable one, livable not only for himself but also for the whole nature(24). Man has not the author's right to nature, but only the duty of a steward who is expected to obey God's directions. He is subject of the will of God who imposes limits upon his use and domination over things (Gen 2:16-17). And therefore when the human seizes and appropriates nature, he becomes a bandit or a usurper. As long as he acts as a steward of God, harmony exists in creation, but once he claims the prerogative reserved to God, as the story of the fall shows, he is out of harmony with the rhythm of the created order. Nature is part of the covenant between God and creation. Humans and animals are covenant partners with God(Gen 9:9-11).

Moreover, the fact that the human was the first to be punished even though he was the last to be created meant that when creation becomes perverted through him, he was



the first to be called to task. This means that he cannot do as he pleased with nature. He must take care of it in the way that God wished it. Besides, his being last to be created and placed in the garden with all natural blessings shows that he is placed into radical connectedness with Nature. It shows that he is given identity through relations with God. He is made to be in solidarity with nature. His createdness makes an ethical relationship of creaturely solidarity and care. Thus the genesis view of man is creaturely solidarity and calls man to put in an effort for maintenance of the world in the service of God and in the direction of God's dream of love and justice(25).

Meditating on the other books of old Testament, we find that the book of Deuteronomy speaks of land as a gracious gift given to humans (Deut 8:7-10). The Deuteronomist expands the Yahwist's idea of nature-human relationship based on the covenant relationship between God and Israel which requires certain duties as "keeping the commandments of the Lord by walking in his ways and fearing him" (deut 8:6) Perusing through the book of Leviticus, the idea of giving rest to the land for a year as found in Leviticus 25:4-5 and the central idea of man's relationship to the land as found again in Leviticus 25:18-19, affirm that: "the land belongs to me and you are only strangers and guests" (Lev.25:23) (26). The idea of stewardship catches this guest relationship that characterizes human on- the -land entrusted



with the wealth that belongs to God. The basis for the radical social legislation in Leviticus 25:1-12 was that the land is a gift from God. "God owns the land" is the fundamental conviction of the old testament. The account of creation makes it clear that God is the real owner. Because God created the world and all that is in it, he is the owner of everything. A number of passages in the old testament further strengthens this conviction (Ps 24:1, Job 41:11, 1 Chron 29:10-14). All this teaches that stewardship is not stewardship of one's own possessions but stewardship of what belongs to God. From this perspective we can understand the prophets' call to be just stewards of God by practising justice (Jer 7:5-7, Is 58:12). The absolute owner is God of the poor and he insists that the earth's resources be shared and therefore the prophets insist that the earth's resources must be shared among the poor. The Bible assumes not the "sanctity" of private property but its social responsibility.

Moving on to the new testament perspective we find that the stewardship is taken from Jesus' parable of the unjust steward, Oikonomos (Lk 16:1-8). The parable of the talents (Mt 25:14-39) or the pounds (Lk 19:11-28) makes it clear that the owner of the land puts severe demands on those to whom he entrusts his goods. Reflection on the idea of stewardship might prompt one to recall that Jesus used his parable of the talents to praise the out-ward looking and dynamic stewardship and to blame the stingy and the static.



God has given us his talents not merely that we preserve them but we may invest them and return a profit to the owner. The biblical God requires us to use his gifts creatively. It is human responsibility to use God's gifts, our talents, and resources of the earth with creative freedom, with the wisdom that chooses the right means to the right goal, not with the foolishness of the prodigal son who wasted his heritage in riotous living without the thought of the consequences to himself and to others (Lk 15:11-32). Responsible stewardship implies a respect for the sacredness of the order of creation, of the earth which was created to be our Eden. Jesus' argument in the parable is based on the assumption that our resources are not ours absolutely, but only held in trust. Including in our wealth of resources are not just the non-renewable ones but also human intellect and imagination. Christian stewardship calls for dedicated application of intellect and imagination on to human problems.

Such scriptural evidence supports the conjecture if not the precise conclusion that human is expected to interact with his environment responsibly, in fidelity to the trust bestowed on him by God. An ethic of responsible stewardship is needed to promote the symbiotic relationship with the eco-system. Every human must safely work at developing natural resources by setting up a symbiotic approach by working in collaboration with nature. So that a humanized eco-system is developed and maintained and people learn how



to alter the earth profoundly without degrading it. The just use of resources respects and safeguards the interactions and balance between plants, animals, people and their environment. In practice, social justice and responsible stewardship demand that society and individual expand their perspectives to include the common good, and the future good. Specifically, we exercise stewardship over the world's resources by a sharing, caring, sparing use of them. What is expected of stewards is that each one should be found worthy of his trust(1 cor 4:2).

Thus though the word "stewardship" as it is used and misused today is not a biblical term, nevertheless there is a concept of stewardship that is everywhere present in biblical thought, a concept or view that regards mankind responsible before God for the use of the created world, the social health of the people, and the maximal development of each person's abilities for the upbuilding of the community(27).

#### Article:2. BIBLICAL THEOLOGY OF INTER-RELATIONSHIP

Even the theology of stewardship does not address the whole of the biblical message regarding creation or the heart of the challenge posed by the global ecological crisis. Stewardship still implies a managerial relationship to nature. And very often the full and rich biblical meaning of the human as steward has been distorted by the dominant anthropocentric view of traditional biblical theology.



A deeper reading of the Bible shows that there is in it a solid and wholesome sacramental approach to creation which does more than urge good stewardship and affirms the intrinsic value, goodness and worth of creation. Such an approach shows that our understanding should move beyond the advice to use earth's resources wisely. This approach in the bible can be called a "theology of" inter-relationship(28).

If we read deeply the creation story of Genesis, it teaches an intrinsic relationship between humankind and nature. It stresses that man, Adam, was created from the ground, adamah. Adam is made from the adamah(Gen 2:7). God created Adam out of the earth; respect for the earth is respect for Adam. When Adam sinned, Bible invites humanity to discover the inter-relationship, harmony, wisdom, and grace given by God within the creation and then to live accordingly(Wis 1:7;7:15-22; 8:6). The whole book of Ecclesiastes speaks of the need for respecting the law of nature for a life of harmony. It admonishes man to live in harmony to live in symbiosis with nature (Eccles 3:1-9,19;8:6,11:3-7) The last chapters of the book of Job(chs.38-41) speak of cosmotheundric approach to creation. Everything in creation is not for human's usefulness, but for God's glory (Job 39: 5-12, 19-25). Everything that exists in the natural world is not meant to be domesticated by human being and subjected to their service but for God to take delight in (Job 38:16-20). Utility is not the primary reason for God's action. Job is invited to sing with Yahweh the wonders of creation.



In these last chapters of the book of Job God is described as the gracious protector of nature and rejoices in his creation. "The Lord by wisdom founded the earth, by understanding he established the heavens" (Prov. 3:19-20).

The theology of inter-relationship takes a cosmotheandric view rather than an anthropocentric view. Creation has an inherent value because of its relationship to God rather than its utility for humanity. It is created and sustained by God, and is for giving glory to God. The God who creates it and sustains it continues to act in it. The creation is God's way of meeting man to bestow his blessings on him. The book of creation is as important as sacred scriptures, because it is a sacrament of God and presents an image, symbol and word of God, since each creature is His personal handiwork, "the work of thy fingers" (Ps. 19:1-6, ps. 8:3). The harmonious melody of the cosmic symphony is an eloquent invitation to be open to the mystery and awe of creation. But it is only the up right and righteous who can "read the creation" and live accordingly (Ps. 33:1-9). "The earth is the Lord's" (ps. 24:1) and therefore calls for a profound theological respect(29). To destroy the earth is to disgrace its maker and owner. 'Mother Earth' touches the chord of gratitude in human beings and makes them sing the Hymns of creation as presented in the psalter"(30). In the psalms we find a deep concern with nature, whose "owner", "protector", "giver" is God (Ps. 24:1, 33-9; 36:6; 50:10-11



65:6-14; 89:12; 95-5; 14-16; 147:4-4, 8-9-15-18). Hence respectful concern for what God loves into existence. In Psalm 104 a theology of inter-realtionship is clearly expressed in the ecological doxology. The author of this psalm depicts the order, symmetry and majesty of creation realities (Ps.104: 1-5,10-23). He tries to reflect on nature, whose mission, he says is to glorify the creator, the preserve of life. (VV.27-30). The various other psalms also have the same theme (Ps 65:7-14; 66:100; 119:91; 148:7-13). The second book of Isiah also has a similar theme (Is 40:12; 42:10-13; 43:16-19; 44:23).

Coming to the new testament, in the synoptic Gospels, Jesus' words and deeds exalt nature in the sermon on the mount (Mt 6:15.34). Jesus says that God crowns the earth with splendour far more than that of solomon. He praises the beauty of the lilies of the field and the care-free life of the birds of the air and says that God's providence extends to them too, even if we are of more value; thereby implying that we are to live in harmony with nature, not to exploit it. He spends forty days of prayer and fasting in the desert and lives in the company of wild beasts ( Mt.4:1-2). A number of parables employ natural symbolisms. "In short, the common world is pictured as a place of transforming presence" (31). In Jesus' parables we find an active relationship between human and nature which is often depicted as the medium for reaching the message of the kingdom of God to humans.



Christology of John's Gospel lifts creation theology to an entirely new level (Jn.12:32) portraying Jesus as the great reconciler between heaven and earth drawing all things to himself(32). The pauline theology of the cosmos groaning for a new creation(Rom 8:21-23; Eph 1:10; Col 1:15-17,20) speaks of the whole creation's (not just humans') rightful hope of deliverance when God may be everything to everyone (1 Cor 15:28). What really seems to be envisioned here is a restoration of the entire universe to a state of goodness that God originally intended for it. We are the 'sons and daughters of God' responsible for the "New creation" of the universe which is being built up day by day in the kingdom of God(33). Pauline theology also speaks of the cosmic christ. The whole cosmos is destined ' to be the body of Christ through our coounion with it. In the book of revelation the physical world is the arena and context for human salvation(34). It also awaits for the fulfilment in the parousia of "a new heaven and new earth" with Jesus Christ who makes all things anew (Rev 21:5). Even though new tesa-  
ment is concerned with the in-breaking of the kingdom of God and deals primarily with the tension between the "ol "  
and "new" order, here too God's revelation is with the "whole"  
of creation which "awaits with eager longing for its redemp-  
tion and transformation"(35). God's work of redemption in  
Jesus Christ encompasses the whole of creation and provides  
the grounds for restoring the brokenness in the relationship  
of humanity to creation and both to God.



a. Towards an Adequate Eco-theology.

A biblical theology of interrelationship would affirm that our first impulse should be to trust and co-operate with creation rather than remake it. We would co-operate with creation by studying the intricate inter-relationship, biospheric culture and community in the created world and by setting up a symbiotic relationship with the eco-system. Contemporary theology needs such an organic and mutualistic way of understanding the world, a model by which we can see that all that exists is interrelated and has an intrinsic worth and value. We need such an appropriate language in theology "understanding God-world and human-world relationships as open, caring, inclusive, interdependent, changing, mutual and creative" (36).

Our dominant world view is today taken through the lens of the enlightenment and the scientific and industrial technomania. A Christian commitment to God's creation must challenge the dominant attitude of moderns in thinking about the world and offer a new vision for societies, rooted in God's ongoing activity as creator, Redemer and sustainer (37). Our past pictures about God's relationship to the creation have been more influenced by the secularization of the world, than by the imagery of the bible or the creativity of God. In our day we have lost that sense of God as Father ever present in the creative development of the world for the



good of all and everything. The biblical pictures and models that convey the theological truth of God as creator, the dramatic images of the incarnation and the metaphors of the spirit's creative presence all speak of how the world's life is connected with and related to God and how God en-flushed into the material life of the creation, so that the Divine mystery is to be experienced in our deep communion with nature. Hence the sacramentality of nature. The sacramental approach must help people to discover the Divine within nature and restore to human beings their position as children of nature(38). "Once human beings see in the visible universe the symbol of the Divine, their attitude to it will cease to be instrumental and will become reverential. Rediscovering the imminence of the Divine, however does not mean sacrificing the transcendence. The transcendence of the Divine will hence forth be seen as revealed in the self-transcendence of nature and history(39).

A Christian theology of creation in future will have to take a cosmotheandric stand and move away from the traditional anthropocentrism that does not see humans as part of the cosmos but as transcendent to it. Humans are included in nature. Nature or cosmos is not outside of them. We are part and parcel of the cosmic whole "which has come to develop a mysterious interiority, the capacity for reflexive thought and freedom and love. The earth is our bodily self, our common Body inseparably and for ever this body, all human



persons have in common with all living things and with the entire cosmos" (40).

Some of our traditional theological concepts can be broadened and deepened by dialoguing with ancient Buddhist view of nature as a constantly changing flux of elements held together in human consciousness or the Hindu concept of the dance of Siva, the material universe forming the body, the field of energies(sakti) which is organized and controlled by the power of siva's consciousness(41). The Indian tradition puts much emphasis on the impenetrability of the Divine mystery in nature and in relation of God-human-nature " The discovery of the Absolute in terms of the Atman-Brahman has enabled the Indian traditional to steer a middle course between sacralization of natural forces in the form of Gods and/or spirits and secularization that look on nature simply as an object that almost calls for exploitation and domination (42). Also Indian cultural holistic tradition with its emphasis on harmony in nature and the need for human to live in harmony with nature rather than exercise dominion over it, could be integrated into such a theology. Human and nature in Indian tradition seen in terms of wholeness and totality is governed by the law of dharma which assigns everything its proper place. To relate thus to nature meant adhering to Rta(dharma) the law governing all cosmic processes. And all labour not in harmony with Rta was an act of sheer violence done to mother Earth, which explains their Pra Yer:



"whatever I dig up of you, O Earth, may you of that have quick replenishment! O purifying one, may my thrust never reach right unto your vital points, your heart(43).

In other values of our culture like ecological ahimsā (non-violence and respect for life in all its forms) Karuna and maitri(compassion and kindness for all beings) if integrated into our theology would help to form in us an ecological consciousness that would tame our violence and exercise our barbarous destructiveness to nature(44).

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## C O N C L U S I O N

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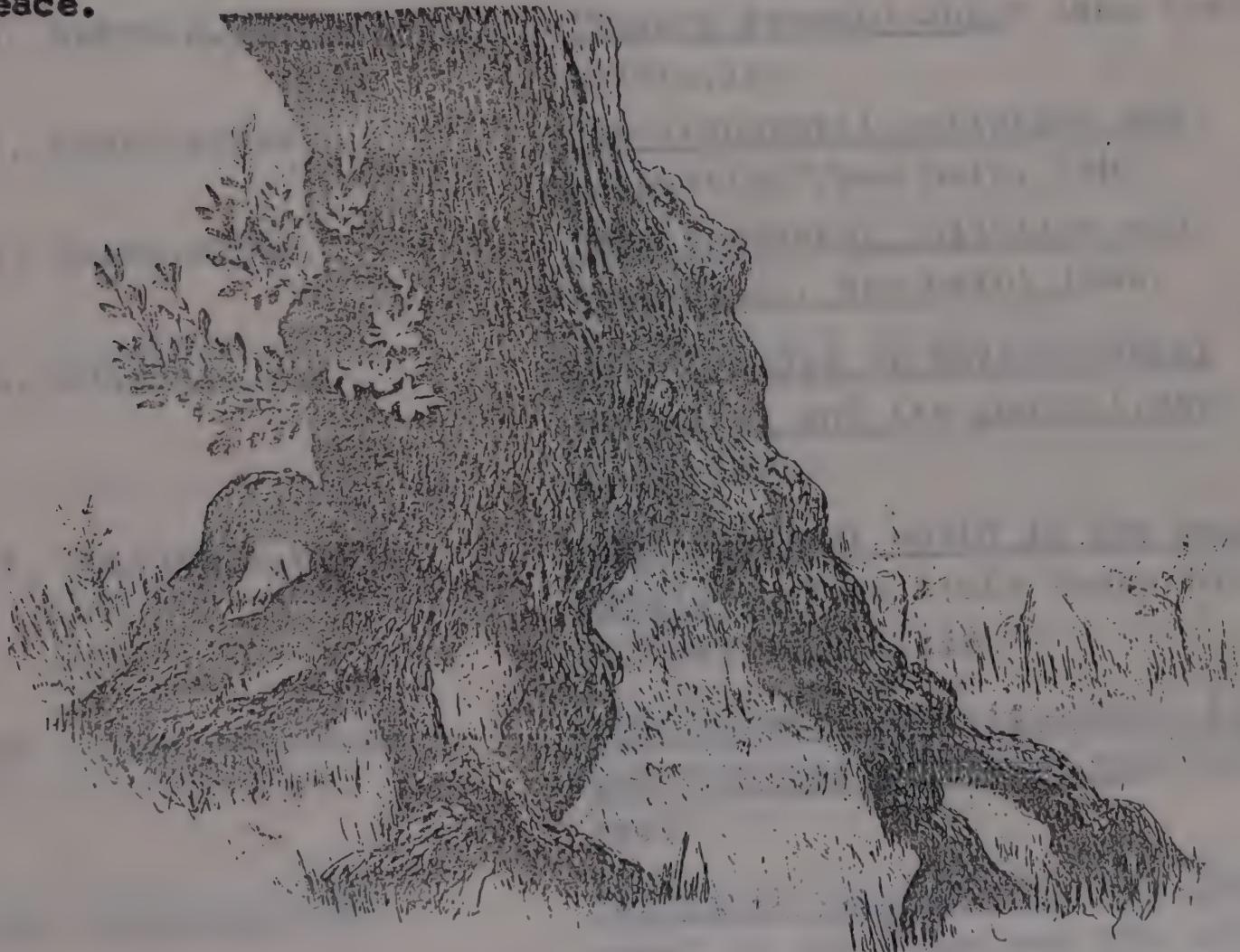
What is a way out? Mani's outlook should radically change. All the developments he undertakes should always be sustainable. "Sustainable development" is a process of social and economic betterment that satisfies the needs and values of all interest groups, while maintaining future options and conserving natural resources and diversity". Such a development should ensure ecological, social, cultural and economic sustainability. Such a development should be "based on universal values concerning people's relationships with nature and each other".

This is possible only if people are able to respect nature and accept that every life form is unique; simply by teaching science, this ecological aesthetics cannot be inculcated in man. Even from childhood man must be taught the wonders of nature, the architectural beauty of creation, the imagination and skill exhibited by nature, to maintain life on this earth.

Yes, as far as we know, this beautiful phenomenon of life exists only on this earth. If it gets destroyed, nobody is going to survive. Even the richest or wisest cannot escape and go to some "safe country" out side our -



globe! So it is time for us all to come together and act together. Let us forget all differences like caste, creed, or colour of people in this world. Let us not build more barriers in terms of political systems or religious beliefs. Environmental threats are global threats. We are in a global emergency. Awake, oh sons and daughters of this beautiful mother earth, fight for her safety, work for the conservation of global nature. Let us pray that this earth exists for our children and their children to live in peace.





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